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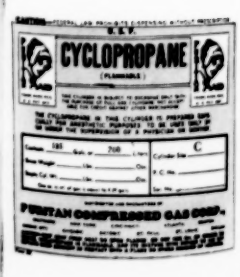

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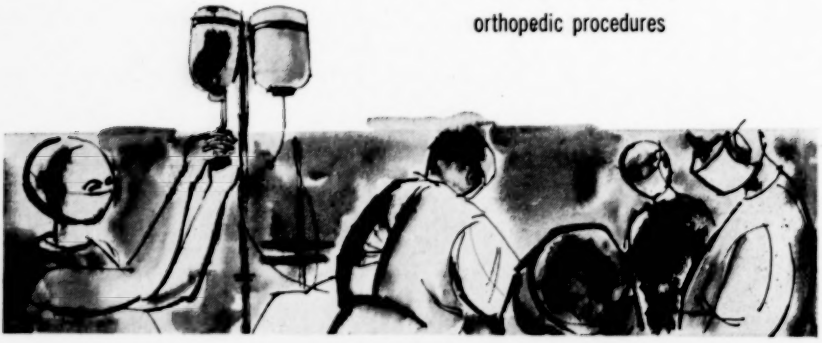

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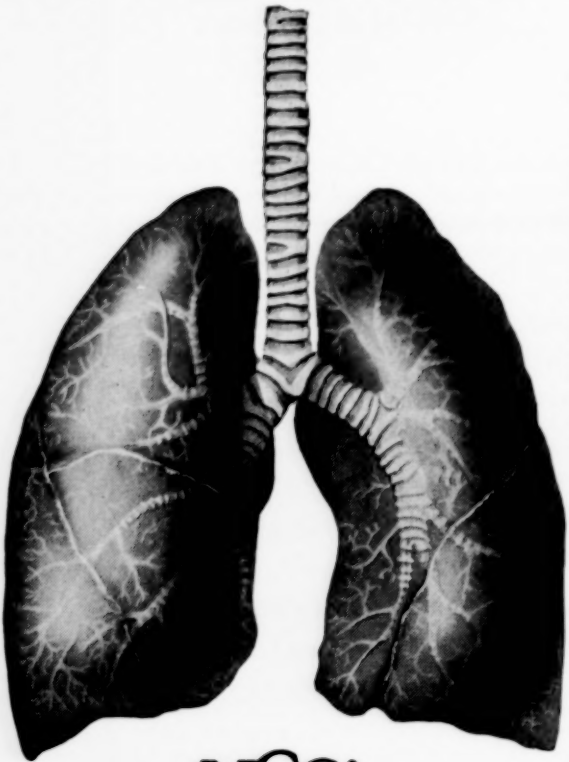

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New Methods for the Conquest of Pain Through the use of Antagonists and A New Management of Analgesia-Amnesia for Cardiac Catheterization in Children Too Young to Cooperate

John S. Lundy, M.D.*
Rochester, Minnesota

Slightly more than a year ago I discussed with you the progress that had been made in a quarter of a century in the relief of pain and distress. Now I shall remark on some experiences that I have had in the last 2 years. These experiences have to do with many of the drugs and procedures about which I spoke a year ago, with the difference that additional experience[1] now enables me to express opinions which a year ago had to remain partly hopes. I think, too, that some of what I said a year ago of necessity could not be stated then as clearly as it can be stated now.

The Theory of Antagonists to Drugs

You may recall that I mentioned antagonists to the undesirable side-effects of drugs, and that I gave as an example the use of bemegride (megimide) to terminate anesthesia produced by pentothal sodium. Since that time certain workers have insisted that the so-called antagonists are not effective. Occasionally this may be true, but by and large, depending of course on the circumstances at hand, certain definite results within a certain length of time can be expected to follow the use of antagonists.

As an instance, let us say that a patient has received preliminary medication and has been anesthetized with pentothal sodium, nitrous oxide plus oxygen. Perhaps succinylcholine or curare has been added, and perhaps the operation has been short. Even so, a fair amount of pentothal sodium may have been used— perhaps 0.5 gm. Then suppose that a dose of megimide of perhaps 50 mg. in 10 cc. of isotonic solution of sodium chloride is administered intravenously. In this instance a period of 5 minutes may elapse before a definite lessening of the depth of the effect of pentothal sodium can be detected.

On the other hand, if the operation is fairly long—perhaps an hour, rather than 15 or 20 minutes—and the same amount of pentothal sodium has been administered, the same preliminary medication has been employed and the same amount of nitrous oxide and oxygen, with the same amount of muscle relaxant, has been used, the effect of the pentothal sodium may be relatively small. In this instance megimide, if given in a 50-mg. dose to such a patient, will produce a noticeable result within 50 seconds.

In still another instance, if some quantity of ether has been added to the nitrous oxide and oxygen, megimide given subsequently will exert little effect, probably nothing more than a slight increase in the depth of respiration.

[1] Read at the meeting of the American Association of Nurse Anesthetists, Atlantic City, New Jersey, October 3, 1957.

* Section of Anesthesiology, Mayo Clinic and Mayo Foundation.
The Mayo Foundation, Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

It is often said that after pentothal sodium is administered the patient remains in a state so closely approaching consciousness that there is no advantage in administering megimide to hasten recovery from anesthesia. Yet I find that I do no harm by the giving of megimide, and that the postoperative nursing care becomes easier when the patient is fully awake; moreover, with this agent I can increase the activity of the reflexes, so that the patient is better able to take care of himself than he would be if I simply left him in a somewhat stuporous state after anesthesia with pentothal sodium.

There are times when, because of some unforeseen occurrence, the condition of the patient is judged to be so unsatisfactory that one perhaps hesitates to remove the intratracheal tube until the patient's reflexes are accelerated. I have had such an experience, involving a deformed patient in whom maintenance of a good airway depended either on leaving the intratracheal tube in place or restoring the patient's reflexes. Megimide served me well in this case.

On rare occasions a patient may be given medication which was not intended for him. At such a time it would be most important that antagonists be available for the restoration of satisfactory respiration. This is particularly true among persons who are especially sensitive to drugs. Under such circumstances one must attend the patient for longer than usual because the effects of the antagonist can become dissipated, and the narcotic may again bring about hypoventilation or even cause the patient to stop breathing.

In such an instance I find that amiphenazide (daptazole), administered in a relatively large dose, with or without megimide, seems to help the patient to breathe. I recall one patient, however, who responded to megimide and daptazole, but not to my entire satisfaction. I thereupon administered levallorphan tartrate (lorfan tartrate) after the megimide and daptazole had been given, and satisfactory respiration was restored. That particular experience points up the fact that it may be necessary to use more than one or two antagonists, if the condition is serious, and if one is willing to exhaust every possible agency to enhance good results. Often, a combination of antagonists may be the answer to a vexatious problem.

A New Management of Analgesia-Amnesia for Cardiac Catheterization

I shall try to illustrate the improved results which it appears can be obtained through the combined use of several drugs. On June 17, 1957, I was requested to evolve a scheme for the management of cardiac catheterization in children too young to co-operate. On June 18 I employed the method I am about to describe, and since that time I have applied the method among 23 persons* with cardiac defects and defects of the great vessels. At the same time I have carried out the same procedure among 51 children who were to undergo tonsillectomy and adenoidectomy or operations on the eye. In addition, I have anesthetized the children with nitrous oxide, oxygen and ether.

In only one child (without cardiac defects or defects of the great vessels) did I encounter too much respiratory depression. Megimide, daptazole and lorfan tartrate were administered to this child before respirations became satisfactory. Of the 23 patients with cardiac defects, only one exhibited respiratory depression. After 4 hours, when the catheterization procedure was finished, megimide was administered and the patient made little or

* As of October 21, 1957, the method has been used in 29 cases.

no effort to breathe for 1½ minutes. This patient, however, although he was 2 years old, weighed only 26 pounds, and because of weakness, never had been able to stand alone or to walk. The arterial oxygen saturation of this patient, breathing air, was never higher than 42 per cent, which is less than half of what would be expected in a normal person.

This method involves the obtaining of an estimate from the pediatrician of how great the risk of cardiac catheterization is on the basis of 1 to 4, 4 being the most marked risk. Such a risk was presented by the patient I have just mentioned, whose fingers, toes and lips were blue, even when oxygen was administered. The method in question is not one involving anesthesia, but is a special application of analgesia and amnesia. Since the patient is breathing either air or oxygen throughout, it is possible for the physician to interpret the data obtained during catheterization, to carry out Van Slyke tests and to reach a definite decision as to the lesion or lesions present, provided that technical difficulties during the course of the test do not make the decision difficult. However, so far as drug effects are concerned, they would not interfere with the test, as would be the case if an anesthetic agent were administered, particularly by inhalation.

In brief, the method involves a visit with the child's parents so that what is about to be done can be explained to them. Then the child is weighed. Weighing usually is done in the morning, the mother having given the child an enema the night before. A 10 per cent solution of pentothal sodium is introduced rectally, calculated at 15 mg. per pound of body weight, and within 5 to 10 minutes the child generally will be asleep. At that time four drugs are given intramuscularly. These drugs are levorphan tartrate (levo-dromoran tartrate), 0.2 mg. per 10 pounds of body weight; lorfan tartrate, 0.1 mg. per 10 pounds of body weight; promethazine hydrochloride (phenergan hydrochloride), 2.0 mg. per 10 pounds of body weight; and proheptazine (WY-757) or alphaprodine hydrochloride (nisentil hydrochloride) may be used instead, 1.0 mg. being administered per 10 pounds of body weight. After 20 minutes the dose of nisentil hydrochloride (if it has been used) may be repeated. In the case of levo-dromoran, even if the child weighs more than 100 pounds and if he is 10 years of age or less, the dose must not exceed 1.0 mg.

This technic is based upon the weight of the child and is calculated against the clock, with due consideration for the element of risk and that of whether or not the child moves. Infiltration is carried out with the local anesthetic agent in the line of incision for venostomy.

For two or three patients in this series the dose was insufficient, so that they cried and moved. I did not consider the situation in these instances satisfactory, although the physician in charge of the procedure felt that it was so much better than had obtained before that he said he would not complain. For the most part, the tests in question require 2 to 4½ hours to complete. During this period, sometimes at 30 to 40 minute-intervals, it may be necessary to repeat the administration of nisentil hydrochloride. If, at the end of 2 hours, much of the effect of the pentothal sodium has almost disappeared, and if the physician in charge of catheterization believes another hour or two might be required, it is well to repeat the rectal administration of pentothal sodium and after 10 minutes to repeat the intramuscular hypodermic injection of levo-dromoran tartrate, lorfan tartrate, phenergan

hydrochloride and nisentil hydrochloride.

Then, at the termination of the test and after the tip of the catheter has been removed from the heart, but before it has been removed from the vein, and after the incision has been closed, 10 mg. of megimide and 15 to 30 mg. of daptazole are injected through the catheter and the catheter is removed. The dose of daptazole will depend on the size of the child (15 mg. for a rather small child and 30 mg. for a large one).

If, during the postoperative period, the child does not breathe well, the doses of megimide and daptazole may be repeated intramuscularly. Whenever an agent is injected intramuscularly into these children, a moment of massage at the site of injection causes rapid absorption. If the blood pressure decreases, one may administer 7.5 mg. of either wyamine sulfate, or methylphenidylacetate hydrochloride (ritalin hydrochloride) can be administered intramuscularly to bolster it. This measure may be repeated, if necessary. My series thus far is too small for cardiac arrest to have occurred. If this complication should happen, I think I would inject, through the catheter to the heart, 1° or 2° cc. (100 mg. of the agent per cc. of solution) of levarterenol bitartrate (levophed bitartrate).

Those patients who represent the poorest risks are hospitalized in the pediatric ward; those whose condition constitutes a good risk will have been awake enough so that they do not require hospitalization. Previously I mentioned a child whose general condition represented a grade 4 risk; I thought this child tolerated the management well, and the pediatrician thought the child tolerated it very well. Actually the child died the next morning at 5 o'clock. Unfortunately, necropsy was not done, but the pediatrician assured me that he was satisfied with the management I have described herein, and he felt it had no relationship to the cause of death of the child. There is a considerable degree of risk in the care of patients such as these, but my pediatric colleagues believe that the management I have described enhances the chance of survival, as compared to procedures that had been in use previously here.

Comment

Since this particular method of management seems to contribute so much to the making of a correct diagnosis, it seems worth while to report it. I have applied this same method of managing small children to the management of 2 patients in the ophthalmologic services, where diagnosis of the condition of the eye depends upon the possibility of thorough examination of the eye. In general, I shall see these patients by appointment, meaning that they will be outpatients, with the objective of abolishing the fear and trepidation with which they regard repeated examinations of the eyes.

I believe I have illustrated the point that, with the aid of antagonists, it is now possible to administer potent drugs in larger doses than ever before. This means that preliminary medication now can be altered to such a degree that the burden placed on the anesthetic agent can be lessened. Somewhat similarly, in the postoperative period pain can be well controlled, because the dose of the analgesic agent employed can be large enough to provide comfort and the antagonist will ensure safety. Here, again, it is seen that a form of "balanced anesthesia" has been developed that tends to be even more nearly "balanced" than anesthesia previously has been.

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1. Lundy, J. S.: Analgesia. (Editorial.) Journal-Lancet. (In press.)

Nurse Anesthetists: Conditions of Employment, 1957

Josephine B. Bunch, C.R.N.A., Portland, Oregon
Lillian G. Baird, C.R.N.A., Ann Arbor, Michigan
Marie McLaughlin, C.R.N.A., and Mary Frances Smith, C.R.N.A.,
South Holland, Illinois New Orleans, Louisiana.*

The need for up to date information concerning the employment conditions of nurse anesthetists prompted the preparation of this report. The most recent survey on employment conditions made by the American Association of Nurse Anesthetists was in 1952.[1] In May, 1957, questionnaires were mailed to all members of AANA for the purpose of obtaining information about salaries, hours and other factors relating to employment.

What of Miss Anesthesia 1957? For whom does she work? What are her hours, her pay and her working conditions? Are these conditions of employment improving? It is hoped that this study will give us some of the answers.

The Response

8,673 questionnaires were mailed to members of AANA: 4,528 were returned (53%). The replies were sorted by state and by hospital size. From the replies, 1,946 were eliminated from the analysis in the following categories.

1. Those from inactive members, 452;—36% of the inactive members of the association.

2. Those from members of religious orders, 99. These represented 20% of the Catholic Sister members of the AANA. The information could not be incorporated in the analysis since salaries were not included, hours were usually listed as 24 hours a day, seven days a week and other questions were usually not answered.

3. Those from members of the Armed Services, 276. These represented 43% of the members known to be working in the Army, Navy and Air Force. The data requested were not supplied by many of those who returned the questionnaire, the reason being given that such information should be obtained from the Office of the Surgeon General.

4. Those that gave "averages" or pooled the information from a group of anesthetists. Several large departments of anesthesia submitted only one reply.

5. Incomplete replies, 1,103.

Of the discarded questionnaires, there was no discernible difference, either by region or by hospital size, from those retained for analysis.

Members of AANA Planning Committee, 1957.

Presented at the Business Session, 24th Annual Meeting, American Association of Nurse Anesthetists, Atlantic City, N. J., October 1, 1957.

1. Bunch, Josephine and Haas, Minnie V.: Survey of Personnel Practices for Nurse Anesthetists, J. Am. A. Nurse Anesthetists 20: 255-259, November 1952.

Table 1

	Number	%
Total Questionnaires mailed	8,673	100
Questionnaires returned	4,528	53
Eliminated:		
1. Inactive members	452	
2. Sisters	99	
3. Armed Service members	276	
4. "Averaged" or "pooled" replies	16	
5. Incomplete replies	1,103	
	1,946	

Response and disposition of questionnaires

THE ANALYSIS

The 2,582 questionnaires used for study seemed to fall into five categories. These were from: Anesthetists employed by hospitals, 2,242; "Free lance" or "self-employed" anesthetists, 91; Anesthetists employed by oral surgeons, 45; Anesthetists employed by physicians, 179, and Anesthetists employed by physicians specifically identified as anesthesiologists, 25.

Table 2

Numbers of usable replies:		
1. Employed by hospital	2,242	86%
2. Free lance	91	3.5%
3. Employed by oral surgeon	45	10.5%
4. Employed by physicians	179	
5. Employed by anesthesiologists	25	
	2,582	

Categorized by Types of Employment

I. The Hospital Employed Anesthetist

Of the 2,242 anesthetists employed by hospitals, there were replies from every state, Hawaii, Alaska and the Canal Zone. The data from these replies were analyzed both by hospital size, and by regions. The five "voting" regions of AANA were used as being more familiar to anesthetists than the larger number of regions used by the American Hospital Association in its analyses.

In an attempt to compare the "roving" habits of its members with those of other hospital personnel, two questions were asked: How many years have you been administering anesthetists? and, How many years on the present job? The response showed that the average number of years in anesthesia was 10.2 and the average years on the present job, 5.0.

Type of Service

To determine, if possible, the coverage of anesthesia service for surgery and for obstetrics, the following questions were asked: Do you give anesthetics for surgical cases? Obstetric cases? Special obstetric cases only? The answers showed that 2,034 (95%) replied Yes to the question concerning surgery; 254 (12%) gave anesthetics for special obstetric cases only; 1,502 (71%) combined obstetric and surgical service.

Hours Worked

Since anesthesia service, by its very nature, must cover a twenty-four hour period, seven days a week, there were two factors surveyed. How

many hours a week (average) do you work in surgery? and, How many hours a week (average) are you on call? Hours on duty: The number of hours on duty varied greatly, ranging from 4 to 60 a week. The average for all hospitals was 37 hours a week. Compared to a similar figure in the 1952 survey, there has been some improvement, particularly noted in the smaller hospitals. Apparently the plan of having anesthetists who are to be on call, remain on duty for an arbitrary number of hours, is no longer practiced so extensively as it had been some years ago.

Hours on call: The second factor—hours on call—also showed a wide range. The small hospital again showed the greater number of hours. The combined average hours of "on duty" and "on call" totaled 89 hours, a decrease since 1952 of 10 hours per week—89 hours in 1957 as compared to 99 hours in 1952.

Obstetric Call

A factor that must also be considered in the hours on duty is that of obstetric coverage. In reply to the question "Does the above include obstetric call?" 1,254 replied "yes" and 988 "no." Of those who replied "no," 39 replies gave the number of additional hours on call on obstetrics alone. The average additional hours each week was 27.

Salary

Probably the question most often asked by administrators and by anesthetists in relation to employment is "What is the monthly salary?"

The analysis here showed that the average monthly salary for the hospital employed anesthetist was $450.00. Here, as in the hours, there is a difference in the hospital size as well as in the regional divisions. The range of salaries begins at $200.00 per month in a small Wisconsin hospital (168 hours combined duty and call, 50 weeks a year!) to above $1,000.00 in a few instances. Compared to the 1952 survey there has been improvement, but not in relation to national salaries in other fields nor to the cost of living.

Table 3

Hospital size	0-49	50-99	100-249	250 and over	Average
1952	41	39	40	43	41
1957	26	34	37	40	37

Hours on Duty

Table 4

Hospital size	0-49	50-99	100-249	250 and over	Average
1952	96	71	47	19	58
1957	106	79	50	35	52

Hours on Call

Table 5

Hospital size	0-49	50-99	100-249	250 and over	Average
1952	137	110	87	62	99
1957	132	113	87	75	89

Combined Hours On Duty and on Call

Table 6

Hospital size	0-49	50-99	100-249	250 and over	Average
1952	$350	$350	$344	$337	$345
1957	$462	$461	$451	$445	$450

Average Monthly Salary by Hospital Size

Probably a more realistic measure of the salary paid to nurse anesthetists would be the hourly pay. As is sometimes done in industry for computing "standby" pay—each hour on call has been valued at one-third hour on duty. Also patterned after payroll gauges, the work month was figured as 4-1/3 weeks. On this basis the hourly rates for 1952 and 1957 were compared.

Table 7

	Week hours on duty	Hours on call	Average hourly salary
1952	41 + (1/3 of 58)	19=60 hrs. x 4-1/3 weeks=260 hours per month at $345.00	=$1.32 per hour
1957	37 + (1/3 of 52)	17=54 hrs. x 4-1/3 weeks=233 hours per month at $450.00	=$1.93 per hour

Calculation of Hourly Pay

These facts speak for themselves.

Overtime and call duty: 95% of those who replied to the questions concerning pay for overtime and for call reported that no additional pay above the salary was paid for extra hours worked or for call. The remaining 5% gave figures that applied to overtime and to call. (The percentages for call and for overtime were so nearly identical that there were only 4 replies difference in the negative answers. The numbers involved were too small to analyze in the final tally.) Eight members reported that they were paid by the hour for call duty, the average for the 8 being $2.21 per hour; 23 were paid on the basis of a fixed fee for nights on call; the amount ranged from $5.00 to $20.00 a night and averaged $10.43 per night on call. Of these 23, 3 received additional pay when they were actually called on a case, the average being $4.66 per case while on call. Seventy-five persons reported that they were paid by the case when on call, the fee ranging from $3.00 per case to $30.00 per case, averaging $8.02 per case on call. Smaller fees were reported in a few instances where minor surgery and obstetrics were involved.

Thirty-two per cent of the members reporting, worked without a known salary scale or a scale based on a combination of tenure and performance. Forty-eight per cent received increases based on tenure, 20% based on performance. A salary differential for members of AANA was indicated in 33% of the replies. However, this figure would seem to be unreliable since many hospitals had only AANA members and this in itself would not necessarily indicate a differential. Would a non-member working as an anesthetist receive less pay?

Perquisites

The custom of supplying room, board and laundry to nurses seems to be becoming obsolete. The 1952 survey showed more than 50% of anesthetists receiving all or part of maintenance, whereas the 1957 analysis shows only 19%, fewer than 6% receiving full maintenance. Room was provided for 6% of the anesthetists reporting. The cash value ranged from $5.00 to $60.00 and averaged $32.35 per month.

The use of a room by anesthetists while on call was not counted as "room provided" when the anesthetist did not "live in." In one instance the anesthetist paid the hospital $30.00

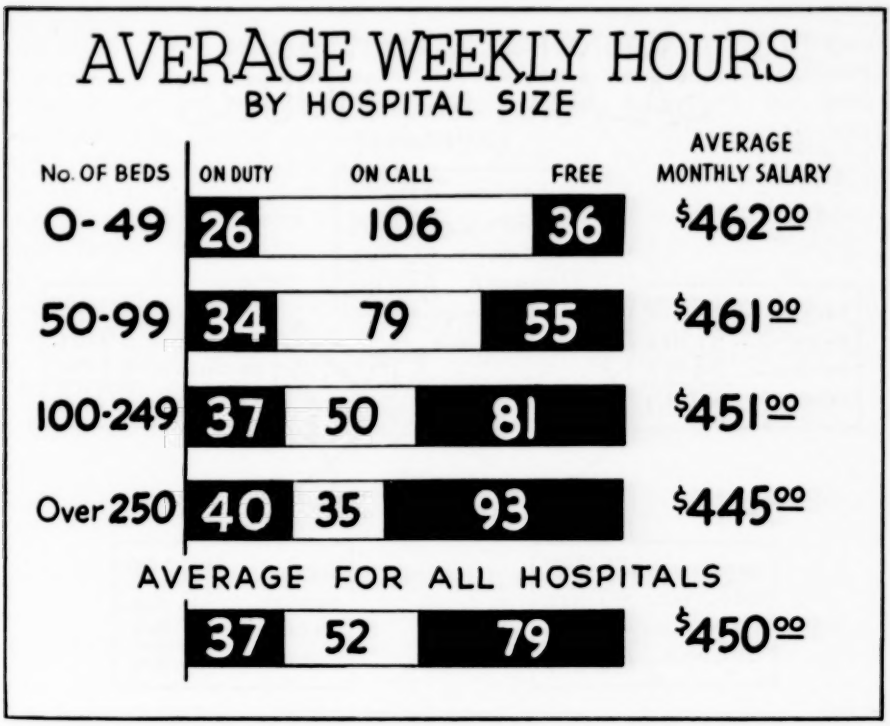


Figure 1

a month for a room in which to sleep while on call! However, in most instances, no charge was made for use of the call room. Provision of room by hospitals of various size differs in that smaller hospitals do provide room oftener than do larger hospitals. Regional differences in this custom are also noted. (See Table 8).

Board: All meals were provided to 4.5% of the anesthetists. The cash value ranged from $12.00 to $80.00 per month, averaging $36.64. Differences in hospital size and in regions also are noted. (See Table 8). Meals while on duty were tallied as "part of board" and 9% reported this type of service in addition to salary. The costs ranged from $4.00 to $45.00 per month, averaging $16.76.

Laundry: Laundry was provided in 14% of those reporting. In many instances the scrub gowns were provided and laundered by the hospital. The cash value placed on laundry ranged from $2.00 to $27.00 per month, averaging $7.45. Compared to the 1952 figures there is a marked decrease in the room and board and laundry provided in addition to salary. Computing the cash value of the room, board and laundry and projecting the figure into the entire sampling results in an average net of $2.66 per month. This could be added to the salary to make an adjusted average income of $452.66. Comparing a similarly projected figure for 1952 ($370.85) shows a net increase of $81.81 in the 5 year period.

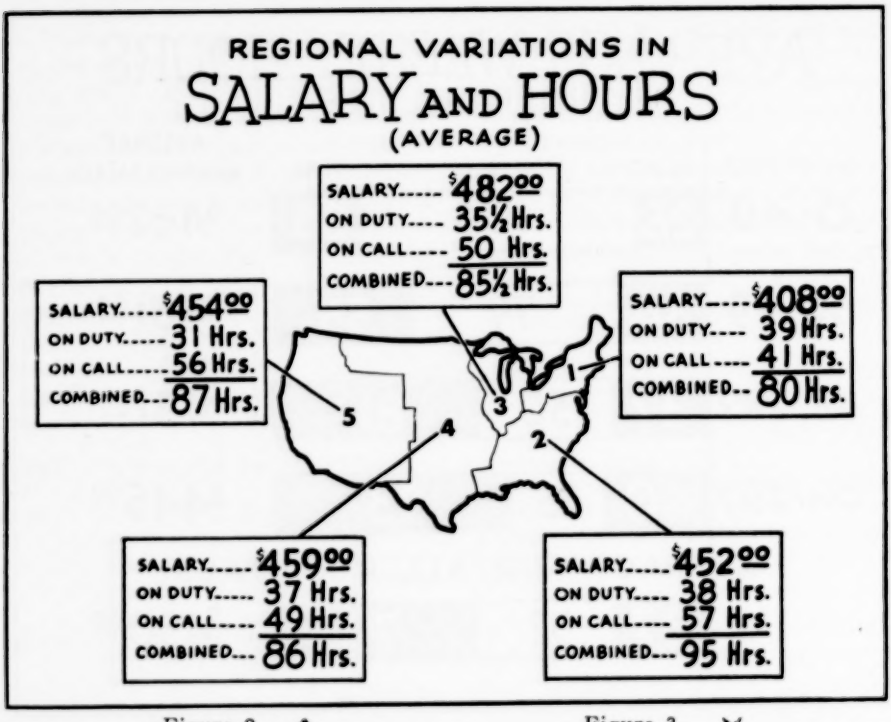
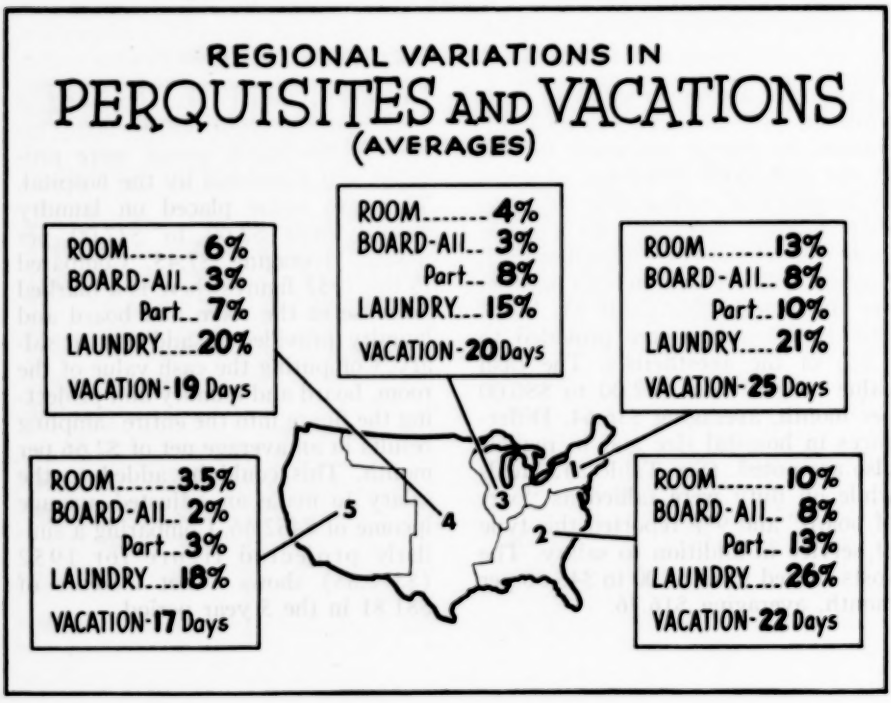


Figure 2 ▲

Figure 3 ▼



Vacations

In addition to salaries and hours, vacations and other benefits are important factors in evaluating working conditions. The average number of days vacation is 2 less than five years ago—19 in 1952 and 17 in 1957. The range is remarkable; from 2 to 90 days. Tenure affects the vacation time, 60% of employers granting longer vacations according to length of service. The average minimum is 14 days per year and average maximum 21 days per year.

Sick Leave

Days of sick leave allowed each year ranged from 0 to 90. In many instances no agreement has been made but the anesthetists "are sure it would be fair." The practice of allowing cumulative sick leave or pay for unused sick days is rare, being allowed by only 6% of employers.

Physical Examination

Periodic physical examinations are required by 39% of employers. An additional number required only an annual chest x-ray.

Table 8

Region	1	2	3	4	5
Room					
% receiving	13%	10%	4%	6%	3.5%
cash value	$30.00	$30.00	$30.00	$37.00	$53.00
Board					
all provided					
% receiving	8%	8%	3%	3%	2%
cash value	$44.80	$41.09	$37.20	$35.59	$10.00
part provided					
% receiving	10%	13%	8%	7%	3%
cash value	$15.23	$16.92	$18.30	$17.57	$19.87
Laundry					
% receiving	21%	26%	15%	20%	18%
cash value	$6.91	$7.49	$9.27	$7.65	$6.65
Vacations					
days per year	25	22	20	19	17

Regional Variations in Perquisites

Professional Meetings

52% of employers give time in addition to vacation for attendance at professional meetings. A small number, 36.5%, give all or part of the expenses for such meetings. Some employers do give permission for attendance at meetings but deduct the time from the salary. Several anesthetists commented that attendance at meetings was a privilege reserved to doctors in their hospitals.

Other Provisions

Social Security is paid for 54% of the members.

Group insurance is paid all or in part by 22% of the employers. Of these, 8% pay all and 14% pay part of the cost of the insurance.

Retirement plans are paid for all or in part by 20.5% of employers; 3.5% paying all and 17% paying part of the costs.

All or part of hospitalization plan

costs were paid for by 31% of employers; 9% paying all and 22% paying part of the costs.

Some sickness and accident benefits were paid by 16% of employers; 11% paying all costs and 5% paying part of the costs.

Other benefits listed by 2% of those reporting included "$6,000.00 life insurance if killed while going to or from work," participation in company, government or group insurance programs, and in 12 of the 2130 replies a Christmas bonus, usually equal to 2 weeks pay.

It would be right to add the cash value of these benefits to the actual cash salary. Since we do not have cash figures, this is not possible. However, these facts should be considered in evaluating the working conditions of anesthetists in hospitals.

Regional Variations

In addition to the national figures there are some features of this survey that would be of interest on a regional basis. We have prepared graphs showing differences in salary and hours on duty and on call.

Region 1, comprising the northeastern states in which one-third of AANA members are employed, shows an average salary of $408.00; 39 hours on duty per week; 41 hours on call per week; combined duty and call, 80 hours per week.

Region 2, the southeastern states, in which approximately one sixth of the AANA members are employed shows an average monthly salary of $452.00; 38 hours per week on duty; 57 hours per week on call; combined call and duty, 95 hours per week.

Region 3, the states surrounding Lake Michigan, in which one-sixth of the AANA members are employed, shows an average monthly salary of $482.00 per month; hours on duty, 35½ per week; hours on call, 50 per week; combined duty and call, 85½ hours per week.

Region 4, the mid-western states, in which one-sixth of the AANA members are employed, shows an average monthly salary of $459.00; 37 hours per week on duty; 49 hours per week on call; combined call and duty, 86 hours per week.

Region 5, the western states, in which one-sixth of the AANA members are employed, shows an average monthly salary of $454.00; 31 hours on duty per week; 56 hours on call per week; combined duty and call, 87 hours per week.

Regional variations in perquisites and in vacation show that in Region 1, 13% of hospital employed anesthetists receive room valued at $30.00 per month; 8% of the members received board at a cash value of $44.80 per month; an additional 10% received part of board at a cash value of $15.23 a month; 21% received laundry at a cash value of $6.91 and the average days of vacation per year were 25.

Region 2 showed that 10% of hospital employed anesthetists received room valued at $30.00 per month; 8% of the members received board at a cash value of $41.09 per month; an additional 13% received part of board at a cash value of $16.92 a month; 26% received laundry at a cash value of $7.49, and the average days of vacation per year were 22.

Region 3 showed that 4% of hospital employed anesthetists received room valued at $30.00 per month; 3% of the members received board at a cash value of $37.20 per month; an additional 8% received part of board at a cash value of $18.30 per

month; 15% received laundry at a cash value of $9.27, and the average days of vacation per year were 20.

Region 4 showed that 6% of hospital employed anesthetists received room valued at $37.00 per month; 3% of the members received board at a cash value of $35.59 per month; an additional 7% received part of board at a cash value of $17.57; 20% received laundry at a cash value of $7.65, and the average days of vacation per year were 19.

Region 5 showed that 3.5% of hospital employed anesthetists received room valued at $53.00 per month; 2% of the members received board at a cash value of $10.00 per month; an additional 3% received part of board at a cash value of $19.87; 18% received laundry at a cash value of $6.65, and the average days of vacation per year were 17.

II. Free Lance Anesthetist

91 members reported as "self-employed" or "free-lance" practice. This represents 3.5% of the usable replies (1+% of the total membership). The average monthly salary was reported as $595.00; the average hours on duty per week as 25; the average hours on call per week, 124; combined duty and call, 149 hours per week. 3% were provided room in the hospital; 3% received board in the hospital; 8% received part of board and 12% were provided with laundry service. Only 3½ days per year vacation were reported by the free-lance anesthetist. Relatively few of the free-lance anesthetists responded to the request for a sample of the fee schedules. However, the following averages for hourly rates and on a per case basis represent the national picture from the small sampling, the largest figure being 39 fees reported.

On a case basis the fees averaged:

For major cases	$22.00
For minor cases	11.25
For obstetric cases	15.00

On an hourly basis the fees averaged:

Major cases:

First hour	$17.80
Second hour	10.37

The range of charges on a case basis was from $7.50 to $30.00 for major cases, and from $2.50 to $15.00 for minor cases. No regional pattern could be discerned in the charges made for free-lance anesthesia service.

III. Employed by Oral Surgeons

45 members reported the employment by dentists and oral surgeons. The average work week was 35 hours; the average salary $423.00 per month; 21 had their uniforms laundered; 2 of the 45 had their noon meals provided; the average vacation was 17 days per year. 16 of the 45 were permitted to attend professional meetings; all of the expenses being paid by the employer in 4 instances and part of the expenses in 3 instances. Sick leave:—3 reported "as much as needed"; 12 reported an average of 10 days sick leave. Only one-third of those anesthetists employed by dentists were paid for sick leave. Only 1 of the 45 was required to have an annual physical checkup; 26 of the 45 had Social Security benefits; 6 had group insurance and 1 participated in a retirement plan. 4 had hospitalization benefits and 3 had sickness and accident benefits. 2 of the 45 received Christmas bonuses, $100.00 and $250.00 respectively. 1 had casualty insurance premiums paid; 1 had personal liability insurance paid and 2 had unemployment and disability insurance.

IV. Employed by Physicians

109 members were employed by physicians not identified as anesthesiologists. The average hours on duty for this group was 32 per week; average hours on call, 64; combined hours on call and duty, 96. The average salary in this group was $464.00 per month and the average vacation, 19 days. Additional benefits were reported by so few that the results were not analyzed.

V. Employed by Anesthesiologists

25 anesthetists specifically mentioned that they were employed by anesthesiologists. The average hours on duty, 35 per week; hours on call, 39 per week; combined hours on call and duty, 74; and the average monthly salary was reported as $465.00. 4% were provided room in the hospital; none received board in the hospital; 8% received part of board and 28% were provided with laundry service, and the average days of vacation per year were 17.

The comparison by types of employment is made in Figure 4.

Summary

The facts have been presented and their interpretation in light of varying circumstances remains for the individual anesthetist or employer. The conditions under which nurse anesthetists work in 1957 range from the situation in which a nurse who has worked for five years, on call 168 hours a week, has had only 6 days vacation in 5 years for $200.00 a month, and asks on the question-

COMPARISON BY TYPES OF EMPLOYMENT

	HOSPITAL	FREE LANCE	ORAL SURGEONS	PHYSICIANS	ANESTHESIOLOGISTS
SALARY	$450.00	$595.00	$423.00	$464.00	$465.00
HOURS ON DUTY PER WEEK	37	25	35	32	35
HOURS ON CALL PER WEEK	52	124	None	64	39
PERQUISITES: ROOM	6%	3%	None	1%	4%
ALL BOARD	45%	3%	None	None	None
PART BOARD	9%	8%	1%	10%	8%
LAUNDRY	14%	12%	49%	40%	28%
PAID VACATION DAYS	16	3½	17	19	17

Figure 4

naire "Would I be unfair to ask for an increase in salary?" to the chief nurse in a large anesthesia department who answered none of the questions because "the salary and privileges I receive would not apply to the average anesthetist." They range from longer hours and lower pay in some areas to "ideal working conditions" in others.

It may not be possible to really convey a picture of the nurse anesthetist of 1957 but a summary of the data would reveal that:

1. She is usually employed by a hospital.

2. The hours spent on duty average 37 each week.

3. The hours spent on call average 52 each week.

4. She has 17 days of vacation each year.

5. She generally does not live in the hospital but often does have a few meals and her laundry provided.

6. She has some additional benefits upon which we (nor she) can put a cash value.

Few complaints were noted. Strange as it may seem, the long hours and relatively small salary are not deterrents to the love of the job. Several of the members in each category wrote under the subject "other benefits" commending the employer and the job. As one member wrote "This is the best job anywhere — I wouldn't change with anyone." This type of reaction was general throughout the questionnaires. In addition to the hours, salaries, vacations, and other factors, we would add as a final comment — "Miss Anesthesia, 1957, likes her job!"

The authors appreciate the statistical tabulations done by the members of the Executive Staff. Statistical analysis and assistance in preparing the questionnaire and the report were the work of Miss Alyce Graham, Counselling and Testing Service, Roosevelt University, Chicago.

The Relationship of the Placenta to Anesthesia and Analgesia

Homer Smith Ellsworth, M.D.*
Salt Lake City, Utah

The obstetrical anesthetist is in the same position as the physician who care for a patient at delivery, in that they have a dual responsibility—two lives to preserve simultaneously, that of the mother and the child.

It has been my experience that each anesthetist, with very few exceptions, realizes this sometimes more than her physician colleagues. They are rightfully concerned about the newborn anoxia that may be impending from the analgesia, over which they had no control. They are even more rightfully concerned about further depression from the anesthetic drugs they administered and do control.

The purpose of this discussion is to try to get the anesthetist to purposefully think not only of adjusting the knobs on the machine, applying the blood pressure cuff, taking the blood pressure, checking the airway, etc., but also to have her spend some time in reflecting as to just what is actually happening to the analgesic drugs the patient has received before delivery, and just what at that moment is happening to the anesthetic which is being disseminated throughout the respiratory tract. All are vaguely aware and would probably reply, if asked, that both anesthetic and analgesic are picked up by the blood stream and transmitted to the fetus.

The placenta is the organ of this transfer. Let us consider the placenta, not as regards its anatomy with maternal and fetal surface membranes, etc., which you all know, but as regards the method of transfer of substances through it to the fetus.

Only when enough anesthesiologists, obstetricians, and physiologists become acutely interested in this problem will an ideal analgesic and anesthetic be found.

The placenta may be considered as a wall which separates maternal and fetal circulations, but through which certain constituents pass unaltered or altered from one side to another. One side of this wall is made up of the fetal endothelial lining of the villous capillaries. The other side consists of the trophoblastic epithelium which covers the villi.[1] From an anesthetist's point of view, this wall in the

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* Obstetrician and Gynecologist, Salt Lake City, Utah, Consultant, Latter Day Saints Hospital.

Presented at the meeting of the Western States Section of Nurse Anesthetists, Salt Lake City, Utah.

individual villi is the key to the whole problem of analgesic or anesthetic depression in the newborn.

The time will come, I am sure, when a satisfactory drug will be found that will not pass this placental barrier. At that time, it will be possible to get more satisfactory pain relief, without the present day fear of anoxia in the newborn. This villous wall barrier, or semi-permeable membrane, whatever you choose to call it, has some extremely interesting characteristics that are not those of a true semi-permeable and which are unique to the placenta as far as I know.

Before discussing this passage of these drugs further, we should note that the permeability of this wall increases as the pregnancy advances. With advancing pregnancy, this barrier, normally a 2-3 cell thick wall, becomes even more attenuated. The number of villi increase so that at term, and at the time we give our pain relieving drug to the parturient, permeability is at its peak.

For example, it has been shown that using radioactive sodium as a tracer substance, the amount of sodium transferred across each gram of placenta in one hour increased from less than one milligram in the first trimester to over six milligrams at the thirty-eight week.[2]

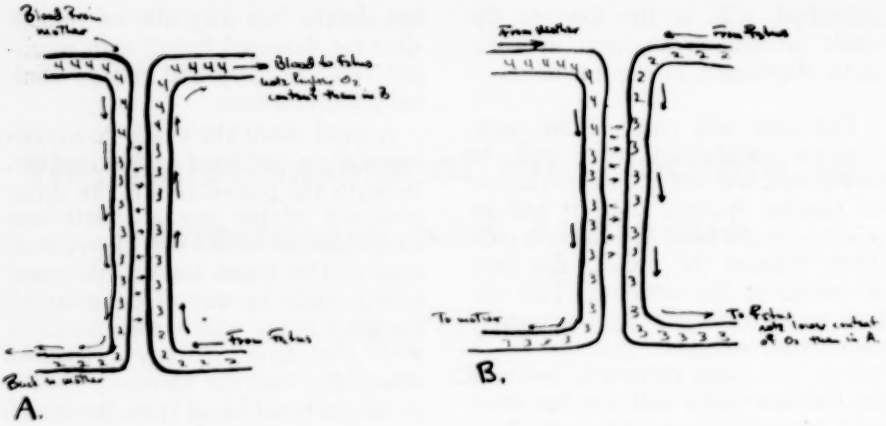
Keeping this fact in mind, let us first discuss the exchange of gaseous substances. Primary in our interest is the exchange of oxygen. This is of transcendent interest because of the effect that oxygenation has upon the immediate and future health of the newborn child. There is increasing evidence that faulty paranatal oxygen is not only responsible for countless deaths, but may also be responsible for damaged brains with resultant cerebral palsy and related clinical manifestations.

A word about the available oxygen supplied to the fetus by the mother. Beneath the placental site, the spiral arterioles of the mother dilate and communicate with the intervillous spaces. The blood leaves this intervillous space by way of the enlarged marginal sinus which communicates with the large maternal decidual veins. The villi are therefore bathed in semi-arterial blood from the mother which is shunted across this placental lake.[3]

Thus, we see that a stream of only moderately well oxygenated or venous blood from the mother enters the placenta, comes in intimate contact, but does not mix with the fetal blood stream which is even poorer in oxygen.

In fact, Eastman has pointed out that the partial pressure of the oxygen presented to the fetal blood is less than that which is found on the top of Mount Everest. Every thinking anesthetist, therefore, should be aware of this low available oxygen pressure to the fetus — a pressure which would not be able to sustain life were it not for three ingenious adaptations which nature has provided for the fetus.

1. It has been shown in animals that the fetal and maternal blood streams flow in opposite directions.[4] This has not been proven true in the human, but Spanner's investigation reveals a functionally similar mechanism.[5] This has an advantage in that the fetal blood has a chance to become saturated, or in equilibrium at the arterial end of the maternal blood stream rather than the venous end. The advantage can easily be seen in graphic form.



The numbers used have no real significance and are strictly illustrative to show the equalization or oxygen tension thru the capillary membrane in

A. Where the blood flow in mother and fetus is in opposite directions.

B. Where the blood flow in mother and fetus are in the same direction.

Effect of Maternal and Fetal Blood Streams Flowing in Opposite and the Same Directions (Adapted from Mossman).

2. The total amount of hemoglobin in the fetus is increased. This is the same adaptation that occurs in adults who live in a high altitude.

3. The fetal hemoglobin is of a special type, which is better adapted to take up more oxygen at any given pressure than is the hemoglobin of adults.

For example, it has been shown by Dr. Donald H. Barron of Yale University[6] that in sheep with an oxygen pressure of only 20 mm. of mercury, which is a very low pressure, that the blood of the adult ewe would be less than 20% saturated with oxygen, whereas the blood of the fetus with its particular type of hemoglobin would be 60% saturated. This represents the third safeguard for the fetus and it is to be able to withstand levels of oxygen pressure, which would prove fatal to an adult.

It is only because of these mechanisms that the fetus can maintain satisfactory oxygenation. It behooves the anesthetist to provide sufficient oxygen with the anesthetic agent, to allow the partial pressure of oxygen to be sufficient, so as not to jeopardize the smallest of the two patients for which she is caring.

In addition, so long as normal healthy conditions prevail in the placenta, a reservoir of oxygen, in combination with hemoglobin, is consistently present to provide for the needs of the fetus. This reservoir has been calculated to amount to at least 40 cc of oxygen in the human fetus at term. This is another safety factor which exists, but is often jeopardized by poor anesthesia.

It should be borne in mind, that according to Drs. Whitacre and Cressman,[7] that it requires five to ten minutes before the infant benefits from the oxygen administered to the

mother. If this is true, then every nurse anesthetist should realize that once a patient has become anoxic, this reservoir of oxygen in the placenta has been utilized by the baby, and it requires from five to ten minutes before it can be completely replaced.

Also, from a practical standpoint, it would make one wonder about the current practice of flushing the patient with oxygen, as the baby is delivered. Such increased oxygenation to the mother will often lighten the anesthetic enough to permit the patient to vomit, or attempt to vomit, as you all know.

Since it requires five to ten minutes for oxygen to get to the baby, and since most placents have separated, or the cords have been clamped before this period of time elapses, I wonder if the risk involved to the mother by increasing the oxygen is of value in view of the questionable results in the fetus.

Gaseous anesthetics are transmitted through the placenta, in the same fashion as the oxygen which we have discussed, and are transmitted to the fetus in direct proportion to the partial pressure which they exert from the maternal blood stream.

Consequently, it follows that the fetus, after 10-15 minutes of anesthetic drug to the mother, receives these gases directly in proportion to the amount being administered. One other thing we should not fail to mention is that sedation or anesthesia should not be blamed for every case of respiratory depression in the newborn. In many cases of precipitous or hard labors, or in tetanic contraction of the uterus, the intrauterine pressure may be elevated to such a degree, or be maintained at a high enough level to force the blood out of the placental lake and force it back into the uterine veins, or even the maternal arterial system. The villi may then be deprived of oxygen and if the condition persists for a sufficient time, asphyxia of the fetus will follow — this completely unrelated to the administration of either analgesia or anesthesia.

Before we pass on to a consideration of analgesic drugs, let us reiterate the important factors concerning the fetus, so that each anesthetist may better realize her position as regards neonatal asphyxia.

First of all, the partial pressure of oxygen available to the fetus is of a sub-critical level. This handicap is overcome by the three adaptations which are made by the placenta and fetus: 1. Functionally, the maternal and fetal blood course in opposite directions in the placenta providing for increased oxygenation of the fetus. 2. The fetus has greater amount of hemoglobin per kilo of body weight than the adult. 3. The hemoglobin is a different character to allow more oxygen carrying capacity.

It is the responsibility of each anesthetist to see that adequate oxygen is available to the fetus so that these safeguards are not compromised. Then, and only then, will the grave danger of fetal anoxia be prevented.

As regarding analgesics, as well as other drugs which are given to the mother, the placenta is an interesting organ of transfer. Some drugs go through very poorly, that from the chemical structure you would expect to pass easily. Even more interesting than this, we have substances such as fructose which pass through readily

to the fetus, but are unable to pass back again to the maternal side.

Some drugs, such as curare,[8] have been shown by recent studies to be fixed or neutralized in the mother, almost immediately upon their administration, leaving only a small fraction available for placental passage. This process, of being fixed in the tissues of the mother, may also be true of other substances, which we now suppose not to pass the placental barrier and which really do pass. However, they are not available in large enough amounts as to be determinable.

Unfortunately, however, most of the commonly used analgesic agents readily pass the placenta. However, because of the small amounts of analgesic drugs which can be given safely to the mother, no real quantitative studies have been done.

I was fortunate enough to work with Dr. Eddie Way on the placental passage of Demerol[9] and it can be easily demonstrated that Demerol, which is undoubtedly the most common or next to most common obstetrical analgesic, readily passes the placenta. Accurate quantitative determinations could not, however, be done because the chemical method was not sensitive enough. This is similarily true of the barbiturates, though quantitatively they have been better studied. It has been shown by Hellman and Shettles,[10] for example, that pentothal sodium will in ten to twelve minutes show equal concentration of the drug in mother and child. This again is important from a practical standpoint in the use of intravenous barbiturates at section. Despite adequate oxygenation which we have discussed, the barbiturates will pass the placenta and depress the fetus.

Anesthetic doses then, of intravenous barbiturates should not be administered for longer periods than six to eight minutes prior to delivery, because after this period of time, they will produce anesthetic levels of barbiturates in the fetal circulation.

One other thing that I should like to mention here, which is only my opinion—all drugs given to the woman in labor should be given intravenously or intramuscularly. It is a well substantiated fact that the gastrointestinal tract of a woman in active labor cannot be relied upon for motility or absorption, so that there can be no controlled dosage with oral administration. This offers an adequate explanation for the commonly noticed phenomena, in which a woman who has received massive doses of analgesic barbiturates, for example, may have little fetal depression because there has been no absorption from the gastrointestinal tract, consequently, no maternal blood level and no passage to the fetus. The converse may also be true. I am sure that each anesthetist here has noted, on numerous occasions, patients who have vomited food taken literally hours prior to delivery, and patients who have vomited up undigested, unabsorbed barbiturate capsules given long periods prior to parturition.

Other substances have been shown to qualitatively pass through the placenta to the fetus. P.S.P. dye passes readily both ways. It can be obtained in maternal urine by injection of the dye into the fetus and vice versa.

The placenta has also been found to be permeable to alcohol, chloroform, ether, morphine, hyoscine, atropine, physostigmine, pilocarpine, ephedrine, the barbiturates, arsphenamine, sulphanilamide, penicillin,

streptomycin, aureomycin, thiouracil and various salts of sodium, potassium, copper and bismuth,[11] as well as several other drugs not mentioned and some which we will discuss. The amino acids readily pass,[12] but the plasma proteins on the other hand, because of their large molecular size, are retained on the maternal side. Here is a good example of the lack of permeability of the placenta because of molecular size.

It would be comforting indeed if we had an effective analgesic of sufficient molecular size to prevent its transference to the fetus. Then the immediate post delivery wear and tear on the anesthetist and obstetrician alike could be avoided. We all have, I am sure (I know that I have when delivering an infant, and I am sure that the anesthetists who work in our hospital have), that two to three minute anxious period when the baby is anoxic or apnoeic, and if this period of anoxia persists our adrenals contract, the pressure is on, and the vague abdominal distress of our ulcer commences.

Unfortunately, with this added strain, many babies are subjected to unsound and unwise therapy as each nurse anesthetist is aware. In this stress situation, the teachings of Dr. DeLee that were taught to nearly every physician are forgotton, in which we were told to keep the baby warm, clear the respiratory tract and give oxygen. Such an area of trauma to the physician and anesthetist could be avoided, with the development of an ideal analgesic that could not get to, or affect the child by some various means.

As I see it, there are three ways this may come to pass. First, as we have already mentioned, by the development of an analgesic drug that does not pass this placental barrier, either because of the size of its chemical structure, or because it is fixed or neutralized by the maternal tissue. The second way that might be feasible, is by blocking the placenta with some drug so that certain analgesics could not pass. Such is now being done, as most of you know, in the tubules of the kidneys by a substance called Probenecid. This substance effectively blocks the tubules, so that penicillin is not excreted but is retained on the vascular side. A substance which could exert a Probenecid like action on the placental wall, so that analgesics would not pass through the fetus, would help prevent fetal depression and anoxia. The third possibility is the development of a drug that would be a complete instantaneous antagonist to the analgesia that the baby has received. This area of research is being investigated at this time and there is now in existence a drug, of which you are all aware, called N-allylnormorphine which is an excellent antagonist to morphine. With this drug, it has been shown that the time of respiration in a patient, who is deeply depressed with morphine, can be dramatically improved. Were related antagonistic compounds to other analgesics available, their immediate administration to the newborn might well circumvent serious neonatal asphyxia with a resultant decrease in newborn deaths, cerebral palsy and the clinical manifestations of postanoxia of the newborn.

These three possibilities for the development of an ideal analgesia are purely personal speculation, and at this point in the investigative research, they can be relegated almost to the area of dream fantasy. However, it is my hope in allowing myself

the pleasure of this speculation, that if more people become interested in this problem, an eventual non-toxic ideal obstetrical analgesia will be obtained.

Unfortunately, from a practical everyday standpoint, as each of you is clinically aware, and as we have discussed, the commonly used analgesic and anesthetic drugs in your hospital readily pass the placental barrier. Gaseous anestheticts most certainly do. Demerol, the barbiturates and hyoscine all do.

So in summary, it behooves each nurse anesthetist to be aware of the critical level of oxygen that exists for the fetus. And it is my hope, that each of you will give the subject of placental passage of these drugs some reflective consideration. The time may well come, when we will be able to find an ideal drug to prevent neonatal asphyxiation, increase our salvage of the newborn infant and prevent the crippling effect of neonatal anoxia.

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Accidental Cardio-Respiratory Arrest

Edward J. Hruska, M.D.*
Salt Lake City, Utah

Accidental cardio-respiratory arrest is a condition which is not rare; it occurs on the average of once a year in every hospital with a busy surgical service. This condition presents the most urgent emergency in diagnosis and treatment. Inadequacy in handling is common in a general surgical service and even more so in the surgical specialties.

Cardio-respiratory arrest occurs most commonly in the operating room, as surgery and anesthesia predispose to it. Where it occurs as a terminal event in a mortal disease such as coronary occlusion it is irreversible. However, where it occurs accidentally, such as the result of hypoxia or reflex action, there follows a period of time in which the condition is reversible.

The pathology of cardio-respiratory arrest is that of anoxia. Complete anoxia in man produces in

10 seconds
loss of consciousness
20-30 seconds
cessation of E.E.G. waves
3-5 minutes
irreversible changes in the cerebrum

The medullary centers can survive 25-30 minutes of complete anoxia and the spinal centers 45-60 minutes of anoxia.

Courville, in his classic monograph on anoxia, states that the pathological changes found in the brain are proportional to the severity and duration of the anoxic episode and the length of the survival period. Pathological changes ranging from edema, petechial hemorrhages, and necrosis of individual nerve cells to complete cortical degeneration may be found. The longer the survival period following the anoxic insult, the greater the number of astrocytes and microglial proliferation.

Where anoxia has persisted to the point of irreversible change in the cerebrum, varying disabilities may be sustained. Where life has been maintained, but severe damage sustained the patient may be left a vegetative organism, a burden to himself and to society. Lesser degrees of damage may result in deafness, blindness, Parkinsonism, athetoid and choreiform movements, speech defects, and emotional disturbances.

Circulation and respiration can fail simultaneously, but more commonly one system fails before the other. Since both systems are interdependent, one cannot function without the other.

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* Assistant Clinical Professor of Anesthesiology, University of Utah.

Presented at the meeting of the Western States Section of Nurse Anesthetists, Salt Lake City, Utah.

Accidental circulatory failure can be regarded to be of two fundamental types:

1. Circulatory collapse; typified by shock.

2. Cardiac arrest; produced by factors acting on the heart or upon centers controlling the heart, with the result that the heart is rendered ineffectual as the motive force in the circulation.

Among the most frequent causes of respiratory arrest are: 1. Paralysis of the respiratory muscle; muscle relaxant drugs and spinal anesthesia involving the cervical segments of the spinal cord. 2. Paralysis of the respiratory center; hypnotics, narcotics, and anesthetics. 3. Reflex effect; occurring under light general anesthesia from a maximal stimulus. 4. Anoxia; as a result of respiratory obstruction, or the inhalation of insufficient oxygen in the respired anesthetic gas mixtures.

Cardiac arrest may take one of two forms: 1. Ventricular fibrillation in which the ventricles are described as without propulsive force due to worm-like contractions. The individual fibers are contracting and relaxing without synchronization. Clinically, ventricular fibrillation is often preceded by auricular and ventricular extra-systoles, ectopic beats, tachycardia, and irregular ventricular rhythms, any one of which may be a precursor to ventricular fibrillation. The predisposing factors include such anesthetic drugs as ethyl chloride, chloroform, cyclopropane, and anoxic states, emotional states with increased epinephrine production and certain drug combinations: cyclopropane-epinephrine and cyclopropane-pituitrin. 2. Cardiac standstill, in which the asystolic heart may develop as a result of an overwhelming vagal reflex, or as the result of anoxia with progressive weakening of each contraction. There is usually some degree of dilatation and the irritability is low. Attempts to increase cardiac irritability may result in ventricular fibrillation.

Certain pharmacologic considerations are essential in understanding the pathologic physiology of this dire emergency.

The analeptic drugs such as coramine, metrazol, caffeine, and strychnine serve to aggravate the existing anoxia of the central nervous system, by stimulating it and increasing its oxygen consumption.

Epinephrine increases the force of muscular contraction of the heart, by direct effect on the myocardium and conducting tissues. It increases myocardial irritability and oxygen consumption. Administered to the failing heart or one in which a pre-fibrillation arrhythmia exists, it may initiate ventricular fibrillation.

Procaine, administered intravenously, diminishes irritability of the myocardium and conducting tissues. Experimentally, it raises the fibrillation threshold of the ventricles, but does not completely protect against fibrillation. Clinically, it is useful in treating arrythmias appearing under anesthesia. Its use in defibrillation is questionable, although reports have appeared claiming its successful use.

The belladonna drugs, atropine and scopolamine, serve to block vagal influences from acting on the sino-auricular pacemaker.

Digitalis intoxication, when producing ventricular arrhythmias, predisposes to ventricular fibrillation under anesthesia.

Quinidine, by diminishing cardiac irritability and slowing conduction of impulses, reduces the hazard of fibril-

lation. It has attained considerable favor in some quarters, as a prophylactic to be used preoperatively, in the presence of certain arrhythmias.

Respiratory arrest does not present any problem in diagnosis for it is easily observed. However, the recognition of cardiac arrest may be and often is quite difficult. Where the operative wound does not permit the palpation of the heart or major artery, there is little reliable guide for diagnosis. A vast majority of patients are doomed, because precious minutes are lost in searching for a stethoscope, frantic palpation of different arteries, and hasty consultation with colleagues to judge a situation with which they are very often unfamiliar. Opening of the thorax is the only conclusive procedure.

Two aims are apparent in the treatment of cardio-respiratory arrest. The first and immediate goal is to deliver oxygen to the tissues. This first aim is attained by simultaneously providing ventilation of the lungs, with artificial respiration and artificial circulation by cardiac massage.

Artificial respiration should be carried out with 100% oxygen. Addition of carbon dioxide is unnecessary since the patient's blood already contains an excess amount of carbon dioxide, resulting from natural metabolic processes.

In the operating room where cardio-respiratory arrest is most likely to occur, artificial respiration is best accomplished by manual compression of the rebreathing bag of the anesthesia machine; a force of 15 to 20 mm. of Hg is usually necessary to accomplish adequate ventilation. An adequate free airway must be obtained; if necessary an endotracheal tube should be inserted.

At present, the most feasible means of providing artificial circulation is cardiac massage. This method employs the heart as a pump, but the force is provided by the operator's hand and this requires adequate exposure of the heart.

The direct approach through the chest wall, by means of a transverse incision in the fourth left intercostal space, with division of the fourth and fifth costal cartilages, is considered superior to an abdominal incision with an attempt to reach the heart through either an intact or incised diaphragm. The heart is grasped and compressed firmly at a rate of 20 to 40 times a minute, depending on the adequacy of filling of the ventricles between compressions. With effective massage, the radial pulse can often be felt and a blood pressure as much as 60 to 70 mm. Hg. obtained.

When artificial respiration and circulation have been attained, the second aim of resuscitation may be pursued without haste or confusion. The second aim is to establish spontaneous heart action and respiration.

The recommended treatment for ventricular fibrillation is serial defibrillation. In this technique an electric current of 1.0 amperes (60 cycles) is passed through two brass discs, 2-3 inches in diameter, which are applied to the sides of the heart. Each shock lasts less than one second; 1-2 seconds elapse between shocks; 3-7 shocks should suffice. The rationale is to merge small fibrillating areas into larger ones, and then to stop the entire fibrillation process with one final shock. The electrodes can be kept sterile in the operating room and application is simple once the heart is exposed.

After defibrillation, the situation is identical with cardiac standstill

and effective massage is the most important measure, until spontaneous rhythmic contractions are resumed. When contractions start they may be quite feeble. At this time the administration of 0.2 to 0.5 cc of a 1:1000 solution of epinephrine into the right auricle or ventricle will often help strengthen the heart beat. This is perhaps the only place for the administration of epinephrine in cardiac resuscitation.

Resumption of spontaneous respiration does not require any specific measures. If proper oxygenation of the brain has been maintained, respiration will be established when the respiratory center recovers from the depression incident to the cardio-respiratory arrest.

In order to further the establishment of complete recovery, adjunctive therapy is desirable: continuation of inhalation therapy through a free airway, and attention to maintaining an adequate urinary output, by supplying sufficient fluids and electrolytes are indicated. Prophylactic measures for the prevention of pulmonary infection, hypostatic congestion, and distention of the bladder are necessary.

In general, where prompt diagnosis has been followed by prompt and efficient treatment, the heart can be restarted. Age of the patient and status of the myocardium, prior to the cardiac arrest and the duration of the anoxic insult, will ultimately determine whether the heart can be returned to normal activity.

The effects on the nervous system are determined by the duration and intensity of the anoxia. If the cardio-respiratory arrest has not exceeded 3-5 minutes, complete recovery may be expected. Slightly longer periods of arrest may be followed by more stormy periods of convalescence, with varying degrees of neurological sequelae.

Summary

Prompt diagnosis and prompt therapy are essential for successful resuscitation from accidental cardio-respiratory arrest. Treatment must be boldly executed according to a carefully worked out plan, consisting essentially of artificial respiration with 100% oxygen and cardiac massage. The success or failure of such a program depends entirely on the length of time the brain is without an effective blood supply.

The Anesthetist's Responsibility for an Adequate Medical Record

Sister Charles Borromeo, S.C., C.R.L.*
Pittsburgh, Pennsylvania

As a Medical Record Librarian, naturally my primary interest rests with medical records. I have been asked by your organization to review the standards as they specifically apply to records of, by and for the Department of Anesthesia, including the Recovery Room, and the Legal Aspects of such records. The art and science of anesthesia have advanced a long way in this twentieth century, and are recognized as essential in the end results of surgery and obstetrics. There are, therefore, certain requirements to be met to maintain safety and efficiency in the use of the various types of anesthesia, and for the protection of the patient and the hospital through its records.

Requirements

First—The Department must be well organized and be under the direct supervision of a physician—one who has profound knowledge of his specialty and knows how to evaluate the risk involved.

Second—The Department must be staffed by competent assistants. Such assistants are usually nurse anesthetists who have specialized in the field of anesthesia. Inasmuch as they are not physicians licensed to administer drugs, they, too, must be under medical supervision.

Third—Pre-anesthetic examination, which includes a complete physical examination of each patient with laboratory studies, should be made and recorded before a general anesthetic is administered. A statement relative to the operative risk should be indicated by **A B C D** or **1 2 3 4**. The Anesthesiologist may be requested by the surgeon to also evaluate the patient and determine the anesthetic best suited. This examination and findings should be recorded.

Fourth — Complete records of all anesthetics administered in the hospital are essential. Such reports should show the condition of the patient previous to and during the operation with pre and post-anesthetic medication. Note of any complication should be recorded—during the induction of anesthesia, such as nausea, emesis, cyanosis or anoxia; during maintenance of anesthesia, such as

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*Medical Record Librarian, Pittsburgh Hospital.

quality of pulse, degree of muscular relaxation, abnormal respirations; during recovery period, such as occurrence of vomiting, respiratory depression, laryngeal spasm or cyanosis.

Recovery Room

One of the most significant advances in the management of the surgical patient is the recovery room unit or post-anesthesia recovery room, sometimes known as P A R Unit. This unit is beneficial both to the anesthesiologist and to the patient. The anesthesiologist immediately becomes the internist in the operating room and acts as a medical consultant to the surgeon. In this unit the patient is observed and treated by the anesthesiologist in the early hours following surgery. All care and measures are provided to revivify the patient to consciousness, and promote a maximum of vital physiologic function, which function may have been impaired by complications of anesthesia or haphazard immediate post-operative care. The various problems and complications which occur in patients recovering from anesthesia and are treated in the recovery unit are—pain, respiratory abnormalities, circulatory collapse, cardiac dysfunction, neuromuscular aberrations, and gastrointestinal problems.

Physical Organization

The basic requirements to be met in establishing such a unit are that it: (1) adjoins the operating room; (2) has a sufficient number of beds and adequate equipment.

The equipment necessary for such a Unit falls in four classes—

(a) Installed or permanent equipment, such as piped oxygen outlets, sinks, cabinets, etc.;

(b) Portable equipment such as beds, stretchers, bronchoscopic apparatus, stethoscopes and various trays;

(c) Supplies, i.e. sterile sets, needles, cut down blocks, records, etc.;

(d) Drugs for pain control, circulatory aids, fluids and sedatives.

Personnel

The personnel of the unit is in three categories—professional, nursing and service. The overall supervision is under the jurisdiction of the Department of Anesthesiology. The Anesthesiologist and Nurse Anesthetists have the responsibility for instructing all personnel in the art of resuscitation, awakening of the patient and in the management of any complication. They are in constant attendance.

The nursing personnel is specially trained by the Anesthesiologist and Nurse Anesthetists and must meet certain prerequisites. Their greatest asset is the awareness of their limitations.

Other personnel such as orderlies and nurses' aides are necessary to perform such duties as transfer of patients, restraining uncooperative patients and securing and maintaining supplies and equipment.

Recovery Room Records

A form of recovery room record is especially useful, as it provides for the complete recording of the patient's condition from the time he leaves surgery until he arrives in his room. Two types of records are recommended for the function of the recovery room — (1) graphic vital sign record which is similar to the ordinary anesthetic record; it pro-

vides a graph for blood pressure, pulse and respiration, space for medication and any remarks pertinent to the patient, and the care provided; (2) fluid balance sheet on which is recorded the intake and output of all fluids.

Legal Aspects

In this legal and suit-conscious era, malpractice hazards are gaining importance steadily. No legislative body could be wise enough to contemplate all the incidents involving such legal matters that might occur in the practice of medicine. In a large measure, the professions themselves set the standards of practice in any given situation, and the law merely requires that these standards be met by the members of the professions. Therefore, all persons in the medical professions are subject to the basic laws of liability. Any one who is not a licensed physician who administers anesthesia must do so under supervision. Although the nurse anesthetist has met all the requirements of training in an accredited school of anesthesia and has further qualified for admission to the American Association of Nurse Anesthetists, she would be considered as being engaged in the practice of medicine unless she was properly supervised by a physician in administering anesthesia. She may be in the employ of the hospital or the physician, either of whom may be liable as her employer. The fact that the employer is liable does not mean that she is not. In a case where both doctor and nurse are liable, the patient can place the liability on his choice of either the hospital or nurse; the case is decided on the basis of whether or not the nurse is negligent. It is basic in law that no person can, by reason of position or relationship to another, escape legal liability for injury to another caused by his negligence.

Legal historians in tracing the origin of our present liability laws are of the opinion that liability was originally founded on the concept that the person or thing causing the injury should bear the responsibility—all of which gives the idea of vengeance.

If a person injures another by his own act or failure to act, that person may be held individually responsible for injuries caused by his negligent conduct, regardless of the position in which he may stand with respect to any other person or institution. Therefore, this law makes nurse anesthetists, as well as all other persons, responsible for their acts. The question that must be answered is—did she or did she not breach the duty which the law imposes upon her? The jury must decide this fact. Expert testimony supplies the information as to what is proper.

The nurse anesthetist is in her rights and under the control of the anesthesiologist when she follows specifically his instructions and orders. This element of control will protect her unless the order she receives from the anesthesiologist was definitely unreasonable. The nurse anesthetist is not expected to exercise judgment.

The nurse anesthetist will also use the equipment provided by the hospital and is thereby protected unless there is something to indicate to her that equipment is defective.

In an action against a hospital and doctor for injuries sustained during administration of an anesthetic, where the question may arise as to whether the nurse anesthetist was the agent of the anesthesiologist or the

hospital, proof of facts would be the deciding factor. If the nurse anesthetist is an employee of the hospital and occupies a position as a servant to the anesthesiologist — sometimes called "lent servant"—for the purposes and duration of the operation, the rule is — "Where a servant has two masters, a general and a special one, the special one, if having the power of immediate direction and control, is the one responsible for the servant's negligence." While the deciding factor is his right of control, however the anesthesiologist has the right to expect that the nurse anesthetist, employed by the hospital, has had adequate training. If she should prove to be incompetent, then the physician would be freed of liability unless he knew, or had reasons to know that she was incompetent.

The common law is not made up of definite rules, absolute and fixed, such as constitute statute law but is a flexible system of principles which can be adapted to new conditions and practices. "A physician shall render the same degree of skill and care as the average physician under the same or similar circumstances." English common law is the basis of our malpractice laws in all states except Louisiana. Some of our Southern states are affected by old Spanish, Mexican and Roman law—but even there all statutes in derogation of the common law are strictly construed. Some states apply a law in certain cases known as "res ipsa loquitur" (things speak for themselves). It is a rule of evidence adopted to aid a plaintiff in certain types of negligence cases in which the accident is unknown to, or can not be ascertained by the plaintiff. In malpractice suits, this is usually applied where something goes wrong under anesthesia, or injuries to some part of the body not under treatment. The application of this law means that the accident speaks for itself, thereby imposing on the defendent the responsbility of coming forth to prove his freedom from negligence. We do not have this doctrine of "Res Ipsa Loquitur" in Pennsylvania; in that State the burden of proof of negligence is on the plaintiff; his own statement as to what happened to him or what constituted negligence have no standing with a Court, unless backed by the testimony of members of the profession to the effect that the procedures described constitute bad medical practice. It takes a doctor to convict a doctor—a nurse to convict a nurse. A doctor who employs a nurse regularly is responsible for her acts since he indicates what and how a job should be done. He is required to enforce safe rules of conduct for her.

The Law Department of the American Medical Association has presented a preliminary report by a committee studying professional liability, which shows that since 1952 the rate of malpractice suits has increased 40 to 43 percent in a survey of 30 states. In order to prevent malpractice litigation, all physicians should be careful to observe the following practices:

(1) Keep adequate records

(2) Obtain proper authorization for medical or surgical procedure

(3) Make adequate use of diagnostic aids

(4) Seek consultation when doubt exists in the physician's mind, when the patient complains of lack of progress or about the course of treatment, or when social or economical considerations so indicate

(5) Do not abandon the patient; give notice of termination of services

(6) Insist on qualified assistants

(7) Maintain equipment

(8) Avoid mention of insurance coverage

(9) Do not guarantee results

(10) Avoid fields in which not properly qualified

(11) Avoid loose, careless talk, and do not criticize previous treatment, unless in possession of all the facts

(12) Maintain the confidence and respect of the patient, for the frequency of malpractice suits is in inverse ratio to the degree of personal relationship between physician and patient.

The American College of Surgeons, in its Bulletin of September-October, 1956, stresses that it is a known fact that two-thirds of all major malpractice suits are surgical. This evidence, along with the fact that the law holds the surgeon and not the hospital responsible for the negligence of assistants in the operating rooms, places a great burden upon the surgeon to try to reduce the risk of malpractice claims.

The law says that the surgeon is responsible for the negligence of nurse anesthetists, interns, residents, and other hospital employees. The anesthesiologist is presumed to be an independent contractor, and the surgeon is not ordinarily liable for the negligence of his physician anesthetist provided the latter is qualified, responsible, and not acting under the direction of the surgeon. In turn, a physician who administers the anesthetic is not liable for the negligence of the operating surgeon. However, in the case of an explosion, the surgeon may be sued along with the anesthesiologist, the hospital and perhaps the manufacturer of the anesthetic equipment.

The fact that two pre-eminent authorities, such as the American Medical Association and the American College of Surgeons have stressed adequate records as a safeguard in malpractice hazards, is another and important reason for good medical records and in their particular appliance to your field, good anesthetic records. These will prove to be a star witness, when occasion demands, to show that there was no negligence and that treatment rendered was adequate and proper.

Even though consent to an operation and anesthesia is implied when a patient places himself under the care of a qualified surgeon and anesthetist, and agrees to rely on their skill and judgment, and even though an oral consent is considered valid. a signed authorization serves as added protection for the hospital, surgeon and anesthetist against claims for unauthorized operations. For certain types of major surgery, such as enucleation of an eye or amputation of a part, additional protection is necessary; the authorization should specifically state the procedure to be performed. An ideal situation will exist if the anesthetist, before administering anesthesia, will personally check for the authorization.

The Joint Commission on Accreditation of Hospitals has made hospital staffs — medical, administrative and ancillary—acutely conscious of standards to which we all aspire. The Joint Commission, in its *STANDARDS FOR HOSPITAL ACCREDITATION*, states that the organization of the Department of Anesthesia in an accredited hospital shall be comparable to that of the other services

of the medical staff. In addition, there shall be required in every case—the records, as previously noted, i.e.—

a. Pre-anesthetic physical examination with findings recorded;
b. Anesthetic record on special form;
c. Post-anesthetic follow-up, with findings recorded.

In its factual report for evaluation of a Department of Anesthesia, the Joint Commission considers the following: The Director of the Department, his qualifications and the time spent in the department; The qualifications of all personnel who administer anesthetics; Equipment with particular attention to its being shock and spark-proof; Humidity control and proper grounding; Whether electrocautery is ever used in the presence of explosive gases; Is the personnel governed by regulations? And, are safety regulations posted?

In surveying a hospital, the Joint Commission representative will include in his report whether or not pre-anesthetic investigation includes a physical examination; an urinalysis and hemoglobin estimation within 48 hours of anesthesia; a record of post-anesthetic follow-up by the anesthetist; and a perusal of the death list to reveal any deaths due to anesthesia.

Summary

We, in Medicine and the paramedical professions, have been granted the signal privilege of ministering to the sick. It is our responsibility to advance with the science of Medicine and to maintain the highest standards of modern education and technique for our paramount interest—the welfare and care of the patient.

In specific application to the Department of Anesthesia, accredited medical authorities recommend, in addition to the fundamentals of anesthesiology, the following contributions to maximum care of the patient: A Recovery Unit which will specialize the immediate postoperative care of the patient to the highest degree; Medical records, adequately maintained, which will record the quality of care given to the patient, will protect the hospital, the surgeon, the anesthesiologist, and the nurse anesthetist in any legal dispute which may arise, and will contribute to research and progress in medicine.

Personally, and on behalf of my fellow medical record librarians, I wish to express my appreciation of the privilege of having been asked to discuss with you some recognized standards as they affect anesthesia and medical records.

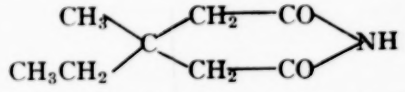
References were obtained from a package provided by the American Medical Association. Among the articles reviewed were reprints from the Bulletin of the American College of Surgeons; Journal of the American Medical Association; Anesthetic Digest; Medical Times; New York State Journal of Medicine; Physicians' Record Company Bulletin and the writings of Dr. Malcolm T. MacEachern, reports of the Joint Commission on Accreditation of Hospitals.

Megimide in the Treatment of Barbiturate Comatose Patients

Sister M. Rudolpha, O.S.F.*
Springfield, Illinois

In the past 10 months at St. John's Hospital, we have had a new experimental drug for use in Barbiturate Poisoning called "Megimide."†[1,2]

"Megimide", brand of B-ethyl-B-methylglutarimide, is a colorless crystalline compound with the structural formula:



Its solubility in water at neutral pH and at room temperature is only 0.5%. This is an advantage in that its low solubility minimizes the risk of overdosage. There had not been demonstrated, so far, any severe contraindications.

The Pharmacology of Megimide has been investigated by Shaw, et.al.,[3,4], using rats, mice, rabbits and dogs. It is effective intravenously as well as intraperitoneally. Its main action seems to be as a barbiturate antagonist.

Harris,[5] demonstrated its action and effects upon patients under clinical anesthesia. Both Shaw and Harris[4,5] have shown it to be a safe drug even with overdosage; the symptoms of overdosage being shown by much excitement and restlessness on awakening, reflexes exaggerated, vomiting and retching and slight muscular twitchings of the fingers, arms and isolated facial muscles. This is easily countered by sedation with paraldehyde or a short acting barbiturate.

Megimide comes as a 0.5% solution in vials containing 100 cc. of solution or vials of 50 mgm. per 10 cc. normal saline. It is given intravenously with caution — the amount depending on the weight of the patient and repeated every 3-5 minutes depending on the response of the patient. Only occasionally does regression occur and further therapy needed. This usually occurs when coma has been prolonged before treatment, or a long acting type of barbiturate has been injected.

During the intravenous administration of the drug, the individual should be assessed by recording after each injection the pulse rate, respiratory rate, blood pressure, muscle tone, deep tendon reflexes and return of laryngeal and pharyngeal reflexes, eye movements, pupillary light reaction, temperature and skin color.

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*Anesthesia Department, St. John's Hospital.

† Megimide was obtained from A. & G. Nicholas, Inc., One Park Avenue, New York 16, New York.

Case Report

March 11, 1957 Reason for admission to hospital—Coma.

History: This 69 year old patient has had diabetes mellitus for several years. She has had several small cerebral thrombi. One with transient hemiparesis. She has compensated glaucoma. She has arteriosclerosis obliterans, and osteoarthritis. For past two weeks she has been resting at home and unable to work. This morning she was apparently as usual. About 12:30 P.M. she was found unconscious by her daughter. She was promptly admitted to the hospital because of coma.

On February 27, 1957 she ordered 24 Tuinal capsules 0.1 gm. She stated the maid had thrown out the capsules and re-ordered 24 more on March 1. When seen at home one capsule of Tuinal was found on the floor beside the bed. The bottle was empty and no other capsules could be found in the apartment. She was immediately admitted to St. John's Hospital.

Physical Examination: Short, obese, comatose, slightly cyanotic — patient breathing irregularly.

Eyes — Pupils slightly contracted. Conjunctiva slightly inflammed and edematous. Eyes prominent.

Lungs — Resonant — no rales.

Heart — Left Border at Mid Clavicular Line. No murmur — Barely audible. Blood Pressure 90/50 at home. Blood Pressure 70/50 on admission. Pulse 84 — regular.

Diagnosis —1. C-V accident probable.
2. Barbiturate intoxication?
3. Diabetes Mellitus.
4. Arteriosclerotic C-V disease. Arteriosclerosis obliterans.
5. Glaucoma compensated.

Prognosis - Grave.

Treament started — supportive therapy given and Megimide given intravenously.

March 11, 1957

4:18 P.M. Megimide 10 ml. given. Pulse 104 — Blood Pressure 128/64 — Respirations 18. Patient responded slightly.

4:29 P.M. Megimide 10 ml. given. Pulse 94 — Blood Pressure 116/62 — Respirations 18. Patient responded somewhat — opened eyes. Gagging reflex present. She tried to push out pharyngeal airway. Lapsed back into sleep.

4:45 P.M. Megimide 10 ml. given. Pulse 96 — Blood Pressure 116/60 — Respirations 18. Patient moved body — pushed out airway. Large amount of mucus aspirated.

5:00 P.M. Megimide 10 ml. given. Pulse 96 — Blood Pressure 118/60 — Respirations 20. Patient responded for a time. Moved body and gagged. Not responding now. More mucus aspirated.

6:00 P.M. Blood Pressure 124/68 — Pulse 104 — Respirations 20.

6:20 P.M. Megimide 10 ml. given. Pulse 96 — Blood Pressure 110/70 — Respirations 20. Patient responding more. Moved about in bed. Opens eyes when spoken to.

6:40 P.M. Megimide 10 ml. given. Pulse 94 — Blood Pressure 114/72 — Respirations 18. Patient moving about restlessly. Eyes open.

7:30 P.M. Megimide 10 ml. given.

7:40 P.M. Megimide 10 ml. given. Patient responding to name. Moving arms and legs.

8: P.M. Blood Pressure 162/62.

10:00 P.M. Patient responded to relatives.

March 12, 1957

1. Patient began to respond after Megimide.

2. Converses this A.M.
3. Urine output improved.
4. Blood Pressure 120/70. Pulse 96 regular.
5. Complains of severe headache.
6. Some slowness of movement and incoordination.

March 13, 1957
1. Improved, responds.
2. Blood Pressure normal.
3. Complains of irritation of nose and throat, headache and pain in heels.

March 14, 1957
Much improved. mild hyperanemic. Rash on back. Less headache. Diarrhea yesterday — now subsides.

March 15, 1957
Headache subsided. Some soreness in right shoulder and back. Sat up yesterday briefly — appetite good.

March 16, 1957
Complains of slight dyspnea. Vision blurred — to have eye specialist see patient.

March 18, 1957
Tension remains elevated.

March 19, 1957
Occipital headache. Insomnia.

Urine: Barbiturates positive. Amount recovered equivalent to 4. mg%, calculatd as phenobarbital.

Gastric Contents: Barbiturates positive. Amount recovered equivalent to 5.5 mg%, calculated as phenobarbital.

Patient remained in hospital for diabetic care and was released 14 days later to be followed by her Physician.

Case Report

March 14, 1957

Husband of the 22 year old female states she took 20 sleeping pills about 1:00 A.M. today. States he noted pill box empty when he was unable to arouse her this A.M. and patient sent to hospital via ambulance. Her physician stated, "I had prescribed 20 Valamid tablets for her 2 days ago." She was seen in Emergency Room in deep state of coma. Oxygen and intravenous Coramine had been administered plus 2 cc. Picrotoxin intravenous just prior to admission on the floor.

Physical Examination: Deep coma. Respirations shallow but regular. Pulse good. Blood Pressure — 90/60.

8:30 A.M. Still deep coma. To try Megimide. 50 ml. I.V. given.

9:00 A.M. Megimide 30 ml. given. Blood Pressure 90/60, Pulse 94. Respirations 28. Movement of eyes and some muscular twitching noted when drug was given. Stomach contents and urine specimen obtained.

1:00 P.M. Another 60 ml. of Megimide given I.V.

2:30 P.M. Patient beginning to respond. Opened eyes. Responded to questions. Patient stated, "It's not worth living. I don't want to live." Blood Pressure 100/58. Pulse 94. Respirations 28. Responding when spoken to. No further Megimide given.

3:00 P.M. Blood Pressure 110/60. Pulse 100. Respirations 30.

4:00 P.M. Awake — talks.

A total of 140 ml. of Megimide was given intravenously over a six hour period. However, the patient was responding after 80 ml. given in the first hour.

Barbiturates found in stomach contents and urine.

Urine: Test for barbiturates was positive. Amount recovered 5. mg% calculated as phenobarbital.

Stomach Contents: Barbiturates positive. Amount recovered equivalent to 6. mg% calculated as phenobarbital.

March 15, 1957
Sitting up in bed. States she took the 20 sleeping pills in attempt to commit suicide — having marital problems. Husband wants divorce.

March 16, 1957
Patient dismissed from hospital.

Case Report

Thirteen month old male infant ingested approximately 10 grs. of Amobarbital at 12:00 P.M. July 27, 1957. At 1:00 P.M., approximately 1 hour later, the child fell asleep and at 4:30 P.M. the child was unable to be roused by the mother. He was

taken to St. John's Hospital, Emergency Room and admitted to the Pediatric Department at 5:00 P.M. and therapy was instituted.

Physical findings — Cyanotic child, extremities and body cold and clammy — unable to arouse even by painful stimuli.
Blood Pressure: Unobtainable.
Respirations: Irregular and shallow — 3-5 per minute.
Pulse: 160 per minute.
Temperature: 97° rectally.
Head
Eyes: Pupils pin point, round — did not react to light.
Ears: Benign.
Nose: Mucus draining from nares.
Mouth: Filled with mucus. No gag reflex elected.
Neck: Supple.
Chest
Lungs: Clear.
Heart: Sounds of good quality. No murmur heard. Rate rapid — 160, regular.
Abdomen
Soft. No masses. No organ enlargement.
Extremities
No deformities.
Reflexes
Deep tendon reflexes hypoactive.
Course:
The patient was immediately given Oxygen by mask and artificial respiration induced — he was suctioned and a stomach tube was passed but very little fluid could be obtained by suction and the tube was removed due to the child's poor condition. A pharyngeal airway was introduced and antibiotics were given intramuscularly. An intravenous solution was started of 5% Glucose in D/W with 2 cc. of Levarterenol. Picrotoxin was given through the intravenous tubing over the next 45 minutes; ½ cc. every 15 minutes, but the child's condition deteriorated.

Megimide was then given into the intravenous tubing in 2-5 cc. increments every 3 to 5 minutes until the child was brought to a "safe state". Pupils which were pin point reverted back to normal and the child cried when aroused by light stimuli. Within the next hour he took fluids fairly well and no further intravenous fluids were needed. The child received a total of 30 ml. of Megimide.

No regression occurred and by the next morning, 12 hours after Megimide was given, the child, although groggy, responded to verbal and touch stimuli well.

Twenty-four hours later he was alert and active and was discharged from the hospital on the third day.

Laboratory Findings

A 24 cc. urine sample obtained on admission by catheter, showed 0.6 mg.% calculated as Phenobarbital.

Summary

1. Three cases of severe Barbiturate Poisoning were presented.
2. The treatment with Megimide and supportive therapy is reviewed.

References

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2. Etteldorf, J. N., Woodbury, R. A.: Journal of Pediatrics, December, 1956, Volume 92, page 698.
3. Nicholas Products Laboratories, Ltd.: Megimide and Daptazole Pamphlet.
4. Shaw, F. H., et. al.: Nature 174, 1954, Page 403.
5. Harris, T. A. B.: Lancet 1, 1955, Page 181.

Notes and Case Reports

Pediatric Anesthesia

It is a privilege to have this opportunity to present to you some of the anesthesia techniques used at Children's Hospital.

Firstly, the technique used for cleft palate procedure, usually on a child 18 months of age.

The patient, with an intravenous in place, reaches the operating floor in his own bed, and is brought to the induction room where he is transferred to a cart. 2½% sodium pentothal solution—1cc to 4cc—is used for induction by attaching the syringe to the stopcock of the intravenous. After the patient has lost consciousness, open-drop ether is administered to obtain the anesthesia plane necessary for nasal intubation. When the nasal tube is in place, it is secured with tape to prevent any motion of the tube that might cause tracheal trauma.

The patient is then moved to the operating room table. Clothing is removed, a stethoscope is applied and a blood pressure cuff attached. A protective towel is laid across the thighs where the strap will hold the child when the table is put in Trendelenburg.

To give the surgeon better visibility, and also to prevent kinking of the nasaltracheal tube, the patient's head is extended by placing a rolled towel under the shoulders. The patient's eyes are protected from the head drape with a strip of vaseline gauze.

To maintain anesthesia, the nasaltracheal tube is attached to a McGill angle joined to a Digby-Leigh valve, using the to-and-fro system of the gas machine, with a flow of 2 liters of N_2O, 5 liters of O_2, and ether.

Meanwhile, a tent-like drape has been raised over the patient. This is done for several reasons: to give a circulation of air that will help keep the patient's body cool; to make the intravenous accessible and for periodic checks of rectal temperature.

Temperature is checked every half-hour. If there is an elevation above 101°, then it is checked every 15 minutes. Should it continue to rise, cold towels or ice bags are applied to the patient.

The operating time for cleft palate procedure ranges from 45 minutes to 2½-3 hours, depending on the severity of the defect. The time factor has a definite relation to a rise in temperature, especially in this type of case. The reasons for this are: (1) Usually a child with a cleft palate previously has had a cleft lip repair with possible narrowing of the nares, which inhibits passage of a large nasaltracheal tube. Therefore, a smaller tube must be used. (2) A smaller endotracheal tube may cause resistance to respirations, and tidal volume may become so small as to allow an increase of carbon dioxide tension in the blood.

A child may be able to overcome this resistance for a short period of time, but will slowly lose his accommodation if the procedure is prolonged.

However, this practical technic for

maintaining anesthesia during cleft palate procedure has proven far superior to the insufflation method, because it prevents the aspiration of blood and secretions, maintains a patent airway, and gives adequate oxygenation.

Secondly, another anesthesia technique relates to a bronchogram procedure. Pre-anesthetic medication is given to the patient 45 minutes before he is taken to the X-Ray department. This medication may be nembutal and atropine, demerol and atropine, or morphine and atropine, according to the physical condition and weight of the child.

After the patient is placed on the X-Ray table, a 2½% solution of sodium pentothal is administered intravenously, followed by open-drop ether, until Lower Plane 2 to Upper Plane 3 of Anesthesia Stage 3 is obtained. To allow for added relaxation during the bronchoscopy that usually follows, mecostrin is given slowly, intravenously, ½cc to 1-2 cc's, according to the patient's requirements.

A bronchoscopy is performed to clear the tracheobronchial tree of copious or tenacious secretions, and to observe any pathological condition.

After the bronchoscopic examination, a satisfactory plane of anesthesia again is obtained with open-drop ether. When Upper Plane 3 of Stage 3 has been reached, the anesthetist inserts an endotracheal tube of the largest size possible. Through this the doctor threads a small catheter. Then under fluoroscopic observation, the catheter is inserted into the left or right stem bronchus, the X-Ray dye is injected and spot films are taken. After the desired films are obtained, the catheter is quickly removed and the endotracheal tube cleared of all oil and secretions.

This anesthetic technic for bronchogram procedure with intubation, has a three-fold purpose: it maintains a patent airway, allows for easy insertion of the catheter and dye, and makes possible the removal of oil and secretions before the patient is returned to the recovery room.

Ruth Duane, C.R.N.A.
Former Chief Nurse Anesthetist, Children's Hospital, Cincinnati, Ohio.

The **TWENTY-SEVENTH QUALIFYING EXAMINATION** for membership in the American Association of Nurse Anesthetists will be conducted on May 10, 1958. The deadline for accepting completed applications including the transcripts is April 7. Notice of eligibility will be mailed about April 14.

Applications should be forwarded early enough to allow time to request transcripts and have them returned to the Executive Office before the deadline date.

CHICAGO

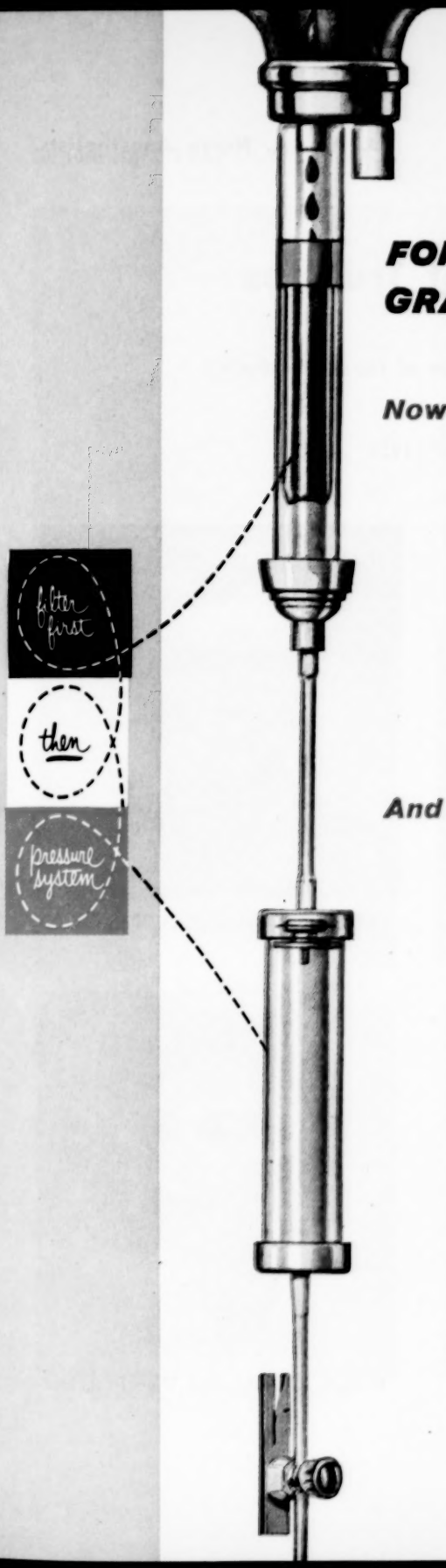
1958

The Annual Meeting of the American Association of Nurse Anesthetists for 1958 will be held in the International Amphitheatre in Chicago. The dates are:

AUGUST 18 - 21

Hotel Headquarters: Congress

MAKE PLANS NOW



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The new Mead Johnson blood set *inverts*, and thus restores, the filter to a more effective, trouble-free position, so that:

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Insurance

$ $ $3,803,837,465 $ $

The above is an astronomical figure. Yet, we have an even larger, much larger figure to deal with later. "Three billion, eight hundred and three million, eight hundred thirty seven thousand, four hundred and sixty five dollars" represents the actual amount of money paid out by Insurance Companies during the year of 1956 for Accident and Health benefits.

In the above the three billion dollar figure is included the payments to AANA members under our group Accident and Health Plan. Regardless of the tremendous size of the national payments or the total payments to AANA members we may only be concerned about the payments to you, as an individual if the need had occurred during 1956.

A figure that surpasses or even shocks us more than the above three billion dollar figure is its insignificance compared to what it really should be.

The loss of income due to Accident and Sickness last year alone cost the American public in excess of 60% of the insured loss. This is an almost unbelievable loss, yet, we still may include amongst the losses, the contributions of the un-insured AANA members.

In either event you as a member are a part of a statistic. Which statistic you are a part of depends on your insurance program participation. Both of these billion of dollars figures increase each year, the automatic increase in population plus the economic and health factors are responsible.

Fortunately "the credit figure" is growing proportionately more rapidly. This is because of sound group plans, such as yours, are growing and gaining more momentum year by year. More and more members are realizing the importance and need of protecting their income against the hazards of sickness and accidents.

We are facing the possibilities of a Flu Epidemic. Health officials predict anything from a mild to an epidemic spread of the Asiatic Flu. In the event of a severe spread, the payments to the American public would more than triple.

As in the case of every threatening epidemic the buying of Income Protection Insurance jumps by leaps and bounds. In some cases the Insurance Companies are not quite willing to assume this unpredictable risk. It is far wiser to be an owner of this protection, before the fire begins.

(Continued on page 272)

See Other Side for Premium Rate Applicable to Your Age

APPLICATION

AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

GROUP INSURANCE PROGRAM

DO NOT WRITE IN THIS SPACE

Principal Sum $_____ Monthly Indemnity $_____ Hospital_____

Premium $_____ | QT. | SA. | ANN. | Hospital Premium $_____

Certificate No._____ Issue Date _____ Series _____

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1. Full Name (please print)?_____
2. Address?_____ City?_____ State?_____
3. Age?_____ Date of Birth?_____ Height?_____ Weight?_____
4. Beneficiary?_____ Relationship?_____
   Address?_____ City?_____ State?_____
5. Are you now to the best of your knowledge and belief in good health and free from any physical impairment or disease? Give details of all exceptions:

   _____

   _____
6. Have you within two years had any injury, sickness, or physical condition requiring a doctor's care or a surgical operation? If so, state nature, dates, and duration of disability:

   _____

   _____
7. Have you been advised to have a surgical operation which has not been performed? If so, when and for what?

   _____

   _____
8. What is your approximate monthly income $_____

I am a member of the group named above and am actively and fully engaged in performing all of my regular duties.

Date_____, 19____ _____
(Signature of Applicant)

Make checks payable to: North American Accident Insurance Company

Send application with remittance to:

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Form 2186—Rev. 56

SPECIMEN ENROLLMENT

CHECK PLAN AND PREMIUM APPLICABLE TO YOUR AGE

The following rates DO NOT INCLUDE THE $10 DAILY HOSPITAL BENEFIT. See Additional Premium Rates below if you desire both the Income Protection and Hospital Plans.

	Ages	Quarterly	Semi-Yrly	Yearly
( ) PLAN A $100 MONTHLY BENEFIT	16-55	$13.20	$25.10	$ 47.50
	56-60	16.50	31.35	59.40
	61-65	19.80	37.60	71.30
( ) PLAN B $150 MONTHLY BENEFIT	16-55	19.80	37.60	71.30
	56-60	24.75	47.00	89.10
	61-65	29.75	56.45	107.15
( ) PLAN C $200 MONTHLY BENEFIT	16-55	26.40	50.20	95.00
	56-60	33.00	62.70	118.80
	61-65	39.60	75.20	142.60

IMPORTANT! Members earning less than $2,500 may enroll in Plan A only.

Members earning $2,500 or more may enroll in Plan A or B.
Members earning $3,000 or more may enroll in Plans A, B or C.

ADDITIONAL PREMIUM FOR $10 DAILY HOSPITAL BENEFIT

	Quarterly	Semi-Yrly	Yearly
Ages 16-55	$5.55	$10.55	$19.50
Ages 56-60	6.95	13.20	25.05
Ages 61-65	8.30	15.80	29.90

Enclosed is my check for $_____ for Plan _____ above on a ( ) Quarterly ( ) Semi-Yearly ( ) Yearly basis. This amount does ( ) does not ( ) include the premium applicable for my age for the $10 Daily Hospital Benefit.

SPECIAL ENROLLMENT

Legislation

Emanuel Hayt, LLB., Counsel A.A.N.A.

New York State Education Department Sanctions Spinal Anesthesia by Nurse Anesthetists

The University of the State of New York
The State Education Department
Albany 1

Charles A. Brind, Jr. Counsel
September 3, 1957

Emanuel Hayt, Esq.
99 Wall Street
New York 5, New York

Dear Mr. Hayt:

I have your inquiry with respect to the administration of spinal anesthesia in hospitals and particularly the administration of spinal anesthesia by nurse anesthetists. I presume, of course, you are referring to registered professional nurses when you use the term nurse anesthetists. I am in agreement that there is no legal provision which distinguishes spinal anesthesia from other types of anesthesia.

It is my understanding that the administration of a spinal anesthesia requires considerable training and skill and, of course, in any situation where a nurse anesthetist might administer it, it is extremely important that such person have adequate training in the techniques and skills necessary for the proper administration of the anesthetic. It is also essential that the nurse perform the technique under the order of the licensed physician related to the specific patient. It would be only under such circumstances that I would be willing to approve the administration of spinal anesthesia by a nurse.

My only comment with respect to your analysis of procedures by the hospital is that I should think that most hospitals would prefer that the orders be written.

Very truly yours,
(Signed) Charles A. Brind, Jr.

New York State Eliminates Hospital Immunity for Medical Acts of Nurses

The New York Court of Appeals by its decision in the case of Isabel Bing vs. St. John's Episcopal Hospital has abandoned the rule which exempted charitable hospitals from liability in personal injuries due to "medical acts" of negligence. Henceforth, such institutions will be responsible for the negligent acts of all professional employees. Until the decision in the Bing case, the courts dis-

tinguished between acts which were "administrative" and those which were "medical." The hospital was liable only in the event the act was "administrative." The new rule includes any and all negligent acts.

Opinion of Court

Following *Schloendorff* v. *New York Hospital,* 211 N. Y. 125, a body of law has developed making the liability of a hospital for injuries suffered by a patient, through the negligence of its employees, depend on whether the injury-producing act was "administrative" or "medical." The wisdom and workability of this rule exempting hospitals from the normal operation of the doctrine of *respondeat superior* have in recent years come under increasing attack. Decision in the present case calls upon us to say whether the rule should longer endure.

The plaintiff, Isabel Bing, was severly burned during the course of an operation, performed at St. John's Episcopal Hospital by her own physician, for correction of a fissure of the anus. She had been made ready for the operation, before the surgeon's appearance, by the hospital anesthetist and by two nurses also in the employ of the hospital. Preparatory to administering spinal anesthesia, the anesthetist painted the lumbar region of the patient's back with an alcoholic antiseptic, tincture of zephiran, an inflammable fluid, reddish in color. Again, after induction of the spinal anesthesia, one of the nurses applied the zephiran solution to the operative area. At that time there were three layers of sheeting under the patient.

The nurses were fully aware that the inflammable antiseptic employed was potentially dangerous. They acknowledged that they had been instructed, not only to exercise care to see that none of the fluid dropped on the linens, but to inspect them and remove any that had become stained or contaminated. However, they made no inspection, and the sheets originally placed under the patient remained on the table throughout the operation.

The surgeon was not in the operating room when the antiseptic was applied and at least fifteen minutes elapsed before he initiated the preoperative draping process. The draping completed, the doctor took a heated electric cautery and touched it to the fissure to mark it before beginning the actual searing of the tissue. As he was about to start the operation itself, there was "the smell of very hot singed linen" and, "without waiting to see a flame or smoke," he doused the area with water. Assured that the fire was out, he proceeded with the operation. Subsequent examination of the patient revealed severe burns on her body, later inspection of the linen, several holes burned through the sheet under her.

In the action thereafter brought against the hospital and the surgeon to recover for the injuries suffered, there was a verdict against both. As to the hospital—with whose liability we are alone concerned — the court charged that that defendant could be held liable only if plaintiff's injuries occurred through the negligence of one of its employees while performing an "administrative," as contrasted with a "medical," act. Upon appeal, the Appellate Division by a closely divided vote reversed and dismissed the complaint. The majority of three, reasoning that the application of the antiseptic was in preparation for the operation and, therefore, part of the operation itself, concluded that the

injury resulted from a "medical" act.

As is apparent, the liability asserted against the hospital is predicated on an independent act or omission of the hospital-employed nurses, and not on any conduct of theirs ordered or directed by a visiting doctor or surgeon or, for that matter, by any physician. The evidence strongly supports the findings, implicit in the jury's verdict, that some of the inflammable zephiran solution had dropped on the sheet beneath the plaintiff's body, that it had left a stain discoverable upon inspection, that the nurses in attendance had had full opportunity—before the beginning of the operation—to remove the stained linen and that the solution (which had dropped on the sheet) had given off a gaseous vapor that ignited upon contact with the heated cautery. In the light of these facts, the jury was thoroughly justified in concluding that the failure of the nurses to remove the contaminated vapor-producing linen constituted the plainest sort of negligence.

But, contends the hospital, such negligence occurred during the performance of a "medical" act and, accordingly, under the so-called *Schloendorff* rule, the doctrine of *respondeat superior* may not be applied to subject it to liability. The difficulty of differentiating between the "medical" and the "administrative" in this context, highlighted as it is by the disagreement of the judges below, is thus brought into sharp focus.

That difficulty has long plagued the courts and, indeed, as consideration of a few illustrative cases reveals, a consistent and clearly defined distinction between the terms has proved to be highly elusive. Placing an improperly capped hot water bottle on a patient's body is administrative (*Iacono* v. *New York Polyclinical Medical School & Hospital,* 296 N.Y. 502), while keeping a hot water bottle too long on a patient's body is medical. (*Sutherland* v. *New York Polyclinic Medical School & Hospital,* 298 N.Y. 682.) Administering blood, by means of a transfusion, to the wrong patient is administrative (*Necolayff* v. *Genesee Hospital,* 296 N.Y. 936), while administering the wrong blood to the right patient is medical. (*Berg* v. *N. Y. Soc. for Relief of Crippled,* 1 N. Y. 2d 499, rvg. 286 App. Div. 783.) Employing an improperly sterilized needle for a hypodermic injection is administrative (*Peck* v. *Towns Hospital,* 275 App. Div. 302), while improperly administering a hypodermic injection is medical. (*Bryant* v. *Presbyterian Hosp. in City of N. Y.,* 304 N. Y. 538.) Failing to place sideboards on a bed after a nurse decided that they were necessary is administrative (*Ranelli* v. *Society of New York Hospital,* 295 N. Y. 850), while failing to decide that sideboards should be used when the need does exist is medical. (*Grace* v. *Manhattan Eye, Ear & Throat Hosp.,* 301 N. Y. 660.)

From distinctions such as these there is to be educed neither guiding principle nor clear delineation of policy; they cannot help but cause confusion, cannot help but create doubt and uncertainly. And, while the failure of the nurses in the present case to inspect and remove the contaminated linen might, perhaps, be denominated an administrative default, we do not consider it either wise or necessary again to become embroiled in an overnice disputation as to whether it should be labeled administrative or medical. The distinctions, it has been noted, were the result of "a judicial policy of compromise between the doctrine of *respondeat superior* and total immunity for chari-

table institutions," (Bobbe, Tort Liability of Hospitals in New York, 37 Cornell L.Q., 419, 438), and, the better to understand the problem presented, a brief backward glance into historical beginnings proves profitable.

The doctrine declaring charitable institutions immune from liability was first declared in this country in 1876. (*McDonald* v. *Massachusetts General Hospital,* 120 Mass. 432.) Deciding that a charity patient, negligently operated upon by a student doctor, could not hold the hospital responsible, the court reasoned that the public and private donations that supported the charitable hospital constituted a trust fund which could not be diverted. As sole authority for its conclusion, the Massachusetts court relied on an English case (*Holliday* v. *St. Leonard's* 11 C.B. (N.S.) 192, 142 Eng. Rep. 769), which in turn was based on a dictum in a case decided in 1839 (*Duncan* v. *Findlater,* 6 Cl. & Fin. 894, 7 Eng. Rep. 934), without apparently observing that the dictum in the earlier case had been overruled (see *Mersey Docks* v. *Gibbs,* L. R. 11 H.L. Cas. 686) and that the decision in the other had been reversed. (See *Foreman* v. *Mayor of Canterbury,* L.R. 6 Q.B. 214.)[1] At any rate, after the *McDonald* case was decided (*supra,* 120 Mass. 432), other courts in this country, though not all on the same theory or for the same reason, followed the lead of Massachusetts in exempting the charitable hospital from liability, and so in time did the courts of New York. (See 4 Scott *on Trusts* [2d ed. 1956], Sec. 402, pp. 2895 *et seq.*; Bobbe, supra, 37 Cornell L.Q. 419, 420-425.)

Although it was not the first case to deal with the general subject in this state, *Schloendorff* v. *New York Hospital* (supra, 211 N.Y. 125) was the most important of the early decisions to be handed down by this court. It was there declared broadly that a charitable hospital was not responsible for the negligence of its physicians and nurses in the treatment of patients. Two reasons were assigned for that conclusion. The first was that one who seeks and accepts charity must be deemed to have waived any right to damages for injuries suffered through the negligence of his benefactor's servants—and yet the rule was not limited to charity patients but was expanded to cover both paying patients and a private or profit-making hospital. (See *Bakal* v. *University Heights Sanitarium,* 302 N.Y. 870, affg. 277 App. Div. 572; *Steinert* v. *Brunswick Home, Inc.,* 172 Misc. 787, affd. 259 App. Div. 1018, leave to app. den. 284 N.Y. 822.) The second reason which the court advanced was that the principle of *respondeat superior* was not to be applied to doctors and nurses. It was the court's thought that, even though employed by the hospital, they were to be regarded as independent contractors rather than employees, because of the skill they exercised and the lack of control exerted over their work—and yet, we pause to interpolate, the special skill of other employees (such as airplane pilots, locomotive engineers, chemists, to mention but a few) has never been the basis for denying the application of *respondeat superior* and, even more to the point, that very principle has been invoked

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1. This historical item prompted one court, which recently abandoned the immunity doctrine, to say: "Ordinarily, when a court decides to modify or abandon a court-made rule of long standing, it starts out by saying that 'the reason for the rule no longer exists.' In this case, it is correct to say that the 'reason' originally given for the rule of immunity never did exist." (**Pierce v. Yakima Valley Memorial Hospital Ass'n,** 43 Wash. 2d 162, 167.)

to render a public hospital accountable for the negligence of its doctors, nurses and other skilled personnel. (See *Becker* v. *City of New York,* 2 N.Y. 2d 226; *Liubowsky* v. *State of New York,* 285 N.Y. 701, affg. 260 App. Div. 416.)

The Schloendorff rule has pursued an inconstant course, riddled with numerous exceptions and subjected to various qualifications and refinements.[2] While it would serve no useful purpose to trace in detail the doctrinal changes and modifications or the shifting theories advanced to support them, we briefly note two or three of the more striking instances. We have already remarked the qualification which excepts public hospitals, those owned by the state or city, from the operation of the *Schloendorff* rule and from the application of the medical-adminstrative distinction. (See, e.g., *Becker* v. *City of New York, supra,* 2 N.Y. 2d 226; *Liubowsky* v. *State of New York, supra,* 285 N.Y. 701, affg. 260 App. Div. 416.) And in *Berg* v. *N. Y. Soc. for Relief of Crippled, supra,* 1 N.Y. 2d 499, revg. 286 App. Div. 783), the court carved another large segment out of that rule by holding that those distinctions were to be discarded in every case in which the injury-producing act was performed by a non-professional employee.

The cases to which we have adverted are not merely illustrations of the fluctuation of doctrine and the vicissitudes of judgment. They rather demonstrate the inherent incongruity of the immunity rule itself. A distinction unique in the law should rest on stronger foundations than those advanced. Indeed, the first ground stated in *Schloendorff*, namely, that there is a waiver by the patient of his right to recover for negligent injury, has long been abandoned as "logically weak" and "pretty much of a fiction." (*Phillips* v. *Buffalo General Hospital,* 239 N.Y. 188, 189.) The second ground—that professional personnel, such as doctors, nurses and internes, should be deemed independent contractors, though salaried employees — is inconsistent with what they have been held to be in every other context and, to a large extent, even in this one. For example, the nurse, regarded as an independent contractor when she injures a patient by an act characterized as medical, is considered an employee of the hospital, entitled to compensation, if she should happen to injure herself by that very same act (see *Matter of Bernstein* v. *Beth Israel Hospital,* 236, N.Y. 268), and, in holding the city responsible for injuries sustained through the carelessness of members of the staff of a city hospital, not only did we recognize that they were employees, to whom the doctrine of *respondeat superior* applies, but we noted the anomaly of treating as independent contractors "persons who by all other tests are clearly employees." (*Becker* v. *City of New York, supra,* 2 N.Y. 2d 226, 235; and of. *Mrachek* v. *Sunshine Biscuit,* 308 N.Y. 116.)

Nor may the exemption be justified by the fear—the major impetus originally behind the doctrine—that the imposition of liability will do irrepar-

2. See, eg., Matter of Bernstein v. Beth Israel Hospital, 236 N.Y. 268; Phillips v. Buffalo General Hospital, 239 N.Y. 188; Sheehan v. North Country Community Hospital, 273 N.Y. 163; Dillon v. Rockaway Beach Hospital, 284 N.Y. 176; Liubowsky v. State of New York, supra, 285 N.Y. 701, affg. 260 App. Div. 416; Bakal v. University Heights Sanitarium, supra, 302 N.Y. 870, affg. 277 App. Div. 572; Mrachek v. Sunshine Biscuit, 308 N.Y. 116; Berg v. N. Y. Soc. for Relief of Crippled, supra, 1 N.Y. 2d 499; Becker v. City of New York, supra, 2 N.Y. 2d 226; Steinert v. Brunswick Home, Inc., supra, 172 Misc. 787, affd. 259 App. Div. 1018, leave to app. den. 284 N.Y. 822.

able harm to the charitable hospital. At the time the rule originated, in the middle of the nineteenth century, not only was there the possibility that a substantial award in a single negligence action might destroy the hospital, but concern was felt that a ruling permitting recovery against the funds of charitable institutions might discourage generosity and "constrain ***[them], as a means of self-protection, to limit their activities." (*Schloendorff* v. *New York Hospital, supra,* 211 N.Y. 125, 135.) Whatever problems today beset the charitable hospital, and they may not be minimized, the dangers just noted have become less acute. Quite apart from the availability of insurance to protect against possible claims and law suits, we are not informed that undue hardships or calamities have overtaken them in those jurisdictions where immunity is withheld and liability imposed. (See, e.g., *President and Dir. of Georgetown College* v. *Hughes,* 130 F. 2d 810, 823-824; *Cohen* v. *General Hospital Society,* 113 Conn. 188, 193; *Pierce* v. *Yakima Valley Memorial Hospital Ass'n,* 43 Wash. 2d 162, 171-172.) In any event, today's hospital is quite different from its predecessor of long ago; it receives wide community support, employs a large number of people and necessarily operates its plant in businesslike fashion.

Based on considerations such as those remarked in the preceding pages, and others, the trend of decision throughout the country has more and more been away from nonliability. (See, e.g., President and Dir. of *Georgetown College* v. *Hughes, supra,* 130 F. 2d 810, 818-822; *Pierce* v. *Yakima Valley Memorial Hospital Ass'n, supra,* 43 Wash. 2d 162, 175-177; Note, 25 A.L.R. 2d 29.) As one court observed, "American judicial thinking, which formerly gave 'overwhelming' acceptance to the immunity rule, now gives that doctrine a very modest majority." (*Pierce* v. *Yakima Valley Memorial Hospital Ass'n, supra,* 43 Wash. 2d 162, 177.) In point of fact, a survey of recent cases — those decided since the middle 1940's — demonstrates, not only that the immunity rule has been rejected in every jurisdiction where the court was unfettered by precedent,[3] but that the doctrine has been overruled and abandoned in a number of states where nonliability had long been the rule.[4]

Although we have hitherto refrained from pronouncing "the ultimate fate" of the *Schloendorff* rule (*Becker* v. *City of New York, supra,* 2 N.Y. 2d 226, 235; *Berg* v. *N. Y. Soc. for Relief of Crippled, supra,* 1 N.Y. 2d 499, 503), we have long indicated our dissatisfaction with it, and only last year, in further expanding the hospital's liability, the court posed this searching and suggestive question (1 N.Y. 2d, at p. 502): "What

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3. See **President and Dir. of Georgetown College** v. **Hughes, supra,** 130 F. 2d 810; **Moats** v. **Sisters of Charity of Providence,** 13 Alaska 546; **Durney** v. **St. Francis Hosp.,** 46 Del. 350; Rickbeil v. Grafton Deaconess Hospital, 74 N.D. 525; **Mary Foster** v. **Roman Catholic Diocese,** 116 Vt. 124.

4. See **Ray** v. **Tucson Medical Center,** 72 Ariz. 22; **Silva** v. **Providence Hospital of Oakland,** 14 Cal. 2d 762; **Wheat** v. **Idaho Falls Latter Day Saints Hospital,** 297 P. 2d 1041 (Idaho); **Haynes** v. **Presbyterian Hospital Ass'n.,** 241 Iowa 1269; **Noel** v. **Menninger Foundation,** 175 Kan. 751; **Mississippi Baptist Hosp.** v. **Holmes, 214 Miss. 906 Pierce** v. Yakima Valley Memorial Hospital Ass'n, supra, 43 Wash. 2d 162.

And, it is worthy of note, there is general agreement among test writers and other commentators that the rule of immunity should be abandoned and the doctrine of **respondeat superior** reaffirmed to render the hospital liable for the torts of its employees. (See, e.g., 4 Scott, **op. cit.,** Sec. 402, pp. 2893 **et seq.**; 2A Bogert, **Trusts & Trustees** (1953), Sec. 401, pp. 241-254; **Prosser on Torts** (2d ed. 1955), Sec. 109, pp. 786 **et. seq.**; 2 Harper and James, **The Law of Torts** (1956), p. 1397, n. 9; Bobbe, supra, 37 Cornell L.Q. 419; Feezer, The Tort **Liability of Charities,** 77 U. of Pa.L. Rev. 191; Note, 163 Journ. Am. Med. Assn. 283, 285.)

reason compels us to say that of all employees working in their employers' businesses (including charitable, educational, religious and governmental enterprises) the only ones for whom the employers can escape liability are the employees of hospitals?"

The doctrine of *respondeat superior* is grounded on firm principles of law and justice. Liability is the rule, immunity the exception. It is not too much to expect that those who serve and minister to members of the public should do so, as do all others, subject to that principle and within the obligation not to injure through carelessness. It is not alone good morals but sound law that individuals and organizations should be just before they are generous, and there is no reason why that should not apply to charitable hospitals. "Charity suffereth long and is kind, but in the common law it cannot be careless. When it is, it ceases to be kindness and becomes actionable wrong." (*President and Dir. of Georgetown College* v. *Hughes, supra,* 130 F. 2d 810, 813.) Insistence upon *respondeat superior* and damages for negligent injury serves a two-fold purpose, for it both assures payment of an obligation to the person injured and gives warning that justice and the law demand the exercise of care.

The conception that the hospital does not undertake to treat the patient, does not undertake to act through its doctors and nurses, but undertakes instead simply to procure them to act upon their own responsibility, no longer reflects the fact. Present-day hospitals, as their manner of operation plainly demonstrates, do far more than furnish facilities for treatment. They regularly employ on a salary basis a large staff of physicians, nurses and internes, as well as administrative and manual workers, and they charge patients for medical care and treatment, collecting for such services, if necessary, by legal action. Certainly, the person who avails himself of "hospital facilities" expects that the hospital will attempt to cure him, not that its nurses or other employees will act on their own responsibility.

Hospitals should, in short, shoulder the responsibilities borne by everyone else. There is no reason to continue their exemption from the universal rule of *respondeat superior*. The test should be, for these institutions, whether charitable or profit-making, as it is for every other employer, was the person who committed the negligent injury-producing act one of its employees and, if he was, was he acting within the scope of his employment.

The rule of nonliability is out of tune with the life about us, at variance with modern-day needs and with concepts of justice and fair dealing. It should be discarded. To the suggestion that *stare decisis* compels us to perpetuate it until the legislature acts, a ready answer is at hand. It was intended, not to effect a "petrifying rigidity," but to assure the justice that flows from certainty and stability. If instead adherence to the precedent offers not justice but unfairness, not certainty but doubt and confusion, it loses its right to survive, and no principle constrains us to adhere to it. On the contrary, as this court, speaking through Judge Desmond in *Woods* v. *Lancet* (303 N.Y. 349, 355) declared, we would be abdicating "our own function, in a field peculiarly non-statutory," were we to insist on legislation and "refuse to consider an old and unsatisfactory court-made rule."

In sum, then, the doctrine according the hospital an immunity for the

negligence of its employees is such a rule, and we abandon it. The hospital's liability must be governed by the same rules of law as apply to all other employers.

The judgment of the Appellate Division should be reversed and a new trial granted with costs to abide the event.

* * * *

CONWAY, Ch.J. (concurring):

I concur in result.

I regret my inability to concur in the opinion of Judge Fuld. I think that, as Judge Fuld points out on page 4 of his opinion, "the failure of the nurses*** to inspect and remove the contaminated linen might, perhaps, be denominated an administrative default, * * *. "I think that it was an administrative default, and that the hospital should be held to be responsible under the reasoning of the many authorities cited and collated in Judge Fuld's opinion. We should stop there and not go on to overrule the doctrine of *Schloendorff* v. *New York Hospital,* (211 N.Y. 125). A voluntary hospital is not conducted as a business. Very few, if any, voluntary hospitals reach the end of any year without a deficit which has to be made up by its board of directors or by other charitable gifts. This is especially so of small hospitals. In my judgment, the doctrine of the *Schloendorff* case has justified itself over the years and has enabled voluntary hospitals to survive. That is particularly so in small communities as distinguished from larger cities. We need both the large and small voluntary hospital. The alternative is public hospitals supported by county or state or stock company hospitals operating as businessess organized for profit. Since it is unnecesary, in my judgment, on these facts to overrule *Schloendorff* v. *New York Hosp.* (supra), I would reverse here on the ground that we have presented to us only a negligent administrative act performed by nurses.

* * * *

Judgment of the Appellate Division reversed and a new trial granted, with costs to abide the event. Opinion by Fuld, J. All concur, Conway, Ch.J., concurring for reversal in a separate memorandum.

(Bing v. St. John's Episcopal Hospital, Court of Appeals, May, 1957.)

(Continued from page 262)

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Book Reviews

Anaesthetic Accidents: The Complication of General and Regional Anesthesia. By V. Keating, M. B., B.Ch., D.A., F.F.A., R.C.S.; Consultant Anaesthetist in Anaesthetics, University College Hospital of the West Indies; late Senior Specialist in Anaesthetics, Royal Army Medical Corps. Cloth. 253 pages. Chicago: Year Book Publishers, by arrangement with Lloyd-Luke (Medical Books) Ltd., 1956. $5.00.

This monograph is a review of the causes of anesthetic accidents and the possible prevention and treatment of these distressing incidents. Much of the author's career as an anesthetist has been spent in isolated places. Not being in touch with a large university, or medical library, he realizes the difficulties encountered in obtaining information about anesthetic complications and trailing their causes. The results of this study will be of particular interest to others similarly placed.

Dr. Keating has brought together in concise and orderly manner current information on the subject. He has supplemented his review of the literature with illustrations from his own experience. Complications of both general and regional anesthesia are discussed.

The book will be invaluable to anyone who administers anesthetics. The author succeeds in emphasizing that the anesthetic may be a much greater hazard than the operation. Since few anesthetists, fortunately, have extensive first hand knowledge of all complications to anesthesia, this book gives the anesthetist an opportunity to be well informed on the problems of anesthetic accidents. References follow each chapter. Indexed.

Aids to Surgical Nursing. By Katherine F. Armstrong, S.R.N., S.C.M., D.N. (Long.), Sister Tutor Certificate, Battersea Polytechnic. Formerly Sister Tutor, King's College Hospital, London, and Editor of the "Nursing Times." Cloth. 440 pages. Bailliere, Tindall and Cox, London. $3.50.

The sixth edition of this text has been revised throughout and new illustrations have been introduced.

The section in which the most alterations have been made are those concerning the treatment of malignant growths, anesthesia with particular reference to hypothermia, the treatment of shock and the surgical treatment of the diseases of the heart and blood vessels.

This is another in the Nurses' Aid Series written by a Sister Tutor, which provides concisely and clearly that information which the nurse needs to possess and will be valuable as a convenient, up to date, comprehensive handbook for nursing procedures that anesthetists as well as other nurses find it necessary to practice. Indexed.

Noradrenaline. Chemistry, Physiology, Pharmacology and Clinical Aspects. By U. S. von Euler, M.D., F.A.C.P. (Hon.); Professor of Physiology, Faculty of Medicine, Karolinska Institutet, Stockholm, Sweden. Cloth. 382 pages. Charles C. Thomas, Publisher, Springfield, Illinois. 1956. $11.50.

The chemistry, physiology, pharmacology and clinical aspects of Noradrenaline are combined in this volume for persons who have occasion to use this agent. Much useful information will be found in the extensive text. To the experimental pharmacologist most of the chapters will be of

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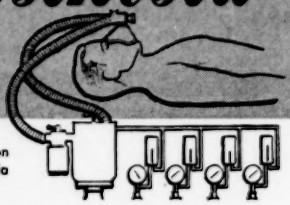

Medical Abstracts

The Role of the Anesthesiologist in Reducing Neonatal Mortality

Despite the fact that anesthesia is employed in 54% of the deliveries in this country, there is a definite lack of interest by the anesthesiologist in obstetric anesthesia. Anesthesia is considered to be third or fourth in importance as a cause of maternal mortality. The death rate for infants during the first 24 hours of life has been virtually unchanged over the past 30 years, and the majority of these deaths involved respiratory inadequacy.

The following methods of solving this problem are suggested:

1. There should be close co-operation between the obstetrician and the anesthesiologist in reference to maternal pain relief. The actual method of pain relief is of little import, providing the drugs selected are administered skillfully. In view of the multitude of medical and obstetrical complications, no one method for pain relief is satisfactory.

2. The anesthesiologist should help in the management of obstetric emergencies. In cases of hemorrhage, he should assist in maintaining blood volume, securing additional blood and providing routes for administration. Prenatal hypotension caused by factors other than hypovolemia should be evaluated and treated. No conclusive data is available on the fall in placental oxygen tension accompanying maternal hypotension and potential fetal anoxia. Oxygen therapy should be employed whenever hypotension or respiratory depression is present, or during increased oxygen demand in the febrile patient. Many medical conditions such as multiple sclerosis, myesthesia gravis, diabetes, poliomyelitis, cardiac decompensation and the like, will cause distress and appropriate treatment should be instituted.

3. If the trained pediatrician is not available, the anesthetist should be prepared to assist in initial infant care and resuscitation, unless problems with the mother demand his constant presence at the head of the table. The infant should be evaluated very shortly after delivery with regard to heart rate, respiratory effort, muscle tonus, cough response and color. Treatment of the infant should include maintenance of the head-down position, efficient pharyngeal suction, maintenance of airway, oxygen therapy and an intubation as needed. Early diagnosis of certain operable congenital abnormalities in the infant should be made, and the corrective procedure contemplated. An accurate record of the events, including the maternal pulse, blood pressure, respiration and fetal respiration, heart tone and rate, and treatment of both mother and infant, is important. This record may provide a reliable guide to the role of anoxia in the etiology of cerebral palsy and mental deficiency.

4. Through accurate record keeping, the anesthetist may assist in research of the physiology of the newborn infant, including such processes as body temperature regulation, respiration, reactions to anesthetics and other drugs administered to the mother, the effects of various forms of inhalation therapy, and a study of narcotic antagonists administered to the newborn.

5. The anesthetist is also responsible for an educational program. The responsibility for teaching members of the delivery room team with regard to these problems rests entirely with the anesthetist in each hospital. In no field is there more hope of improvement in mortality statistics than in the newborn period, if intelligent co-operation in teaching exists between the obstetrician and the anesthesiologist, pediatrician and delivery room nursing personnel.

Reference: Apgar, Virginia, New York Journal of Medicine, Volume 55, pages 2365 to 2368, 1955. New York.

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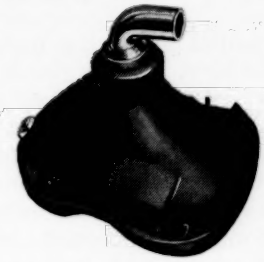

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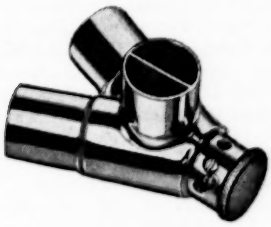

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value; however, for the clinical nurse anesthetist the chapters on physiological and pharmacological actions and the chapter on therapeutic use will be of great interest.

Clinical Applications of Suggestion and Hypnosis. By William T. Heron, M.A., Ph. D., Professor of Psychology, University of Minnesota. Cloth. 165 pages. Charles C Thomas, Springfield, Illinois. $3.75.

Dr. Heron does not intend this monograph to be a compendium of knowledge about hypnosis and suggestion and assumes that a background of this knowledge has been obtained.

The author clearly states the principles which have practical application in the clinical situation, and it is this portion of the book that will be of greatest interest to nurse anesthetists who may work with physicians or others who practice this special art.

In an added chapter, Dr. D. Jacoby, San Mateo, California, gives the script for a tape recording which he has found useful in his dental office.

This monograph is written solely for professional use and will be valuable to the physician, dentist and psychologist in his practice.

A bibliography follows the text. Indexed.

Manual of Anesthesiology: For Residents and Medical Students. By Herman Schwartz, M.D., S.H. Nagi, M.D. and E. M. Papper, M.D., from the Anesthesiology Service, The Presbyterian Hospital, and Department of Anesthesiology, Columbia University, College of Physicians and Surgeons, New York, New York. Cloth. 170 pages. Charles C Thomas, Springfield, Illinois. $4.25.

The authors present a condensed but complete source of primary and basic information to the resident in Anesthesiology.

The essential information includes: basic physiology of the circulatory, respiratory and nervous system; basic chemistry, pharmacology, and physics of the various agents employed for anesthesia; discussion of the premedication, as well as the preanesthetic information necessary; review of the diagnosis and treatment of common anesthetic complications; review of pediatric anesthesia; methods of respiratory and cardiac resuscitation and tables of normal values.

This monograph is another in the American Lecture Series and will be a useful reference to all anesthetists. Bibliographic references follow each chapter. Indexed.

The Recovery Room. Immediate Postoperative Management. By Max S. Sadove, M.D., Professor of Surgery (Anesth.) and Head, Division of Anesthesiology, University of Illinois College of Medicine and the Research and Educational Hospitals, and James H. Cross, M.D., Clinical Assistant Professor in Surgery, University of Illinois College of Medicine. Cloth. 597 pages, illustrated. W. B. Saunders Company, Philadelphia and London, 1956.

Drs. Sadove and Cross have assembled important data based on their experience in the organization and development of recovery rooms.

In this volume, the authors have presented the planning and function of a recovery room with details of the procedures. The immediate postoperative care of the patient for all of the surgical specialties is presented in detail. Illustrations are utilized to demonstrate the various types of equipment employed for the proper care of the patient.

The vast amount of information contained within this volume will be exceedingly helpful to anesthetists and others planning a recovery room and an invaluable reference to all persons actively engaged in the function of a recovery room.

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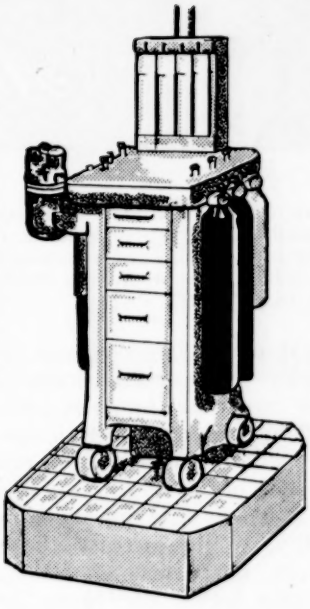

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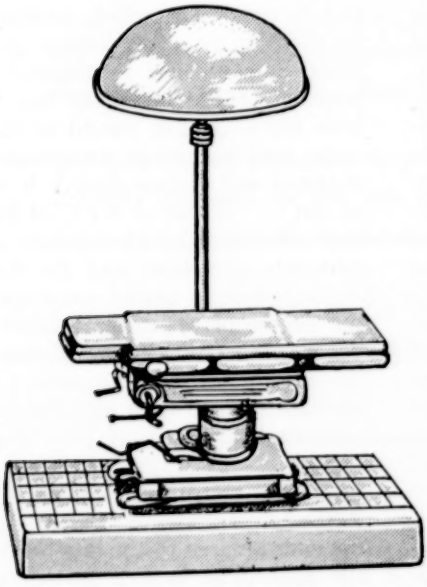

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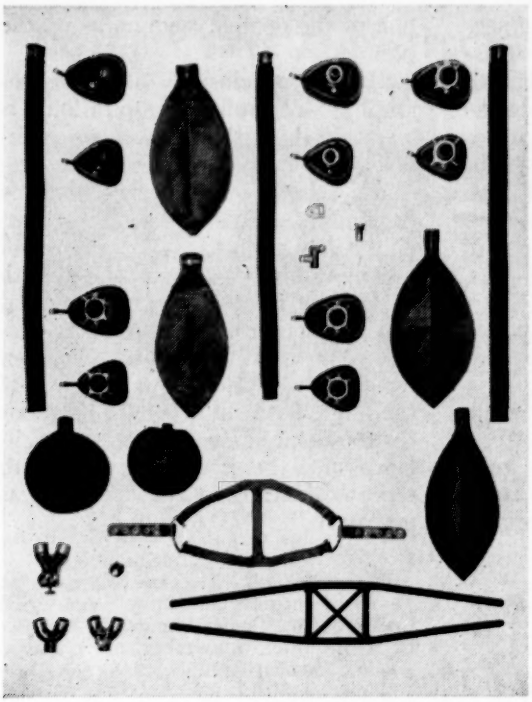
Abstracts

Boone, G. D. A technique of intravenous pentothal sodium-succinylcholine anesthesia for bronchoscopy and bronchography (a report of 600 cases). Arizona Med. 13: 352-356 (Sept.) 1956.

"Because bronchoscopy and bronchography are psychologically formidable procedures for most patients and many referring physicians it seemed desirable to attempt to evolve a technique of intravenous anesthesia which would be safe and of minimal morbidity, would increase the efficiency of the bronchoscopist, and would give technically better bronchograms. A combination of Pentothal sodium for narcosis and amnesia with succinylcholine for muscular relaxation was considered to offer the best possibilities. This presentation is a description of the technique used in 600 bronchoscopies and 285 bilateral bronchograms since early 1952. There have been no deaths, no serious operative or postoperative difficulties or complications, and no apparent drug or opaque medium reactions. Acceptance of the procedure by patients and referring physicians has been most gratifying . . . .

"Usually no preoperative medication is used unless the presence of bronchospasm indicates the need for Aminophyllin either intravenously or by suppository. If the patient has received cortico-steroids, 100 mg. of Solu-Cortef is given intravenously about one hour preoperatively. An occasional patient requires Dramamine, 25 mg. intramuscularly for alleviation of postoperative nausea. The infusion set consists of a 20 c.c. syringe with a three-way petcock attached via a short plastic or rubber tube to a 20 gauge needle. The flask of succinylcholine, suspended from an adjustable intravenous stand, is connected to the petcock with plastic tubing. The syringe is filled with 2½% Pentothal sodium solution, the needle is inserted into a vein in the right forearm, and both needle and syringe are securely affixed to the forearm by 1-inch adhesive. The forearm is then firmly strapped to the armboard. Induction is accomplished by injecting 8-10 c.c Pentothal sodium . . . .

"The succinylcholine drip is then allowed to run at 40 to 50 drops per minute. From this point on respiration is either controlled, assisted, or by diffusion . . . . Respirations are assisted or controlled by manual compression of the breathing bag filled with 100% oxygen for 30 to 60 seconds until maximum oxygenation is obtained and carbon dioxide is worked out . . . . Three or 4 c.c. of Pentothal solution may be injected intermittently as needed and the flow of succinylcholine varied according to the degree of relaxation desired . . . . When bronchography is planned . . . the anesthesiologist . . . inserts a cuffed endotracheal tube and the cuff is adequately inflated. A bite block is placed and a strip of 1-inch adhesive with each end bifurcated for several inches is passed around the neck and the ends secured to the bite block and the tube. The oxygen system is attached to the endotracheal tube and manual compression of the oxygen



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bag is resumed. An 18-inch-long segment of a size 16 French K-10 Kaslow plastic stomach tube attached to the syringe containing the opaque medium is passed through the orifice of the nipple of the right angle endotracheal connector. Hereafter the bronchoscopist directs the procedure and operates the fluoroscopic screen . . . .

"In the presence of localized or general impairment in pulmonary dynamics or with bronchospasm or bronchostenosis, the opaque medium may not distribute uniformly, necessitating repositioning of the tube and/or instillation of more opaque medium. Frequently, added pressure on the oxygen bag at this point is helpful . . . . When the X-ray technician is ready for a Bucky exposure, the anesthesiologist exerts firm pressure on the filled oxygen bag, stopping all respiratory motion at full inspiration. The technician, at a signal from the anesthesiologist, makes the exposure. Studies with the oscillograph reveal a marked bradycardia during this period which has proven to be of no hazard. The bradycardia is conducive to technically better roentgenograms with no blurring from heart motion. The anesthesiologist then fully respirates the patient several times and a second right lateral exposure is made. Right posterior oblique exposures are similarly made if desired. The patient is then turned to the left posterior semioblique position . . . . The room is darkened, the plastic tube is partially withdrawn, and the anesthesiologist passes the tube into the left bronchus, utilizing its natural curve. If this is unsuccessful after a few attempts, the tube is withdrawn until its end is at the lower end of the trachea. Under fluoroscopic vision the bronchoscopist then directs instillation of the opaque medium as on the right . . . .

"Upon conclusion of bronchography, controlled respiration is maintained, with intravenous solutions discontinued, until patient resumes normal respirations and he is responding. This usually requires only a few minutes. The trachea and bronchi are repeatedly aspirated with a catheter through the endotracheal tube until thorough coughing is elicited. The endotracheal tube is then removed with adequate toiletry of the nasopharynx and mouth. The patient is kept under constant surveillance until he is fully awake, with repeated cleansing of airways as necessary."

Davenport, H. T. and Keenleyside, H. B.: Interstitial emphysema and pneumothorax associated with the use of a modified non-rebreathing valve. Canad. Anaesthetists' Soc. J. **4:** 126-130 (April) 1957.

"The idea of using non-rebreathing systems recurred throughout the first hundred years of anaesthesia, and special interest has been shown at the start of the second hundred years in valvular non-rebreathing apparatus, particularly in paediatric work . . . .

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Cohen, E. N., Theissen, H. H., and Marvin, Joseph: Repository curare in normal obstetrics, a controlled study. Am. J. Obst. & Gynec. **72:** 323-325 (Aug.) 1956.

"Curare in repository forms has proved a useful adjunct in the relief of muscle spasm in a variety of painful conditions . . . . With the availability of a satisfactory form of repository curare, producing on single injection a sustained blood level of curare for 8 to 12 hours, it was thought worth while to study the effects of this preparation on the obstetrical patient. Since the personal factor necessarily enters into such measurements as pain relief, muscle relaxation, etc., it was felt that the significance of this study would be completely dependent upon careful controls.

"Accordingly, 200 consecutive normal obstetrical patients were alternately given an injection of repository curare (Lenahan's schedule), or an identical placebo without the active curare principle. Injections were given at the beginning of active labor or the achievement of dilatation of 3 to 4 cm. Only code numbers were available to those participating in the study, and the code numbers were changed at intervals. Only in the final tabulation of the data sheets was the control group separated from the drug series. All patients were given routine obstetrical care according to the practice of the attending physician . . . .

"[There was] no significant differences between the two groupings. An exception is noted in that there was a significant reduction in the number of episiotomies in the multiparous patients, when the Tubadil series is compared with the control series. There were no harmful effects on mother or child with the preparation used. The further use of repository curare in routine obstetrics is not justified from this report."

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